SHARP OPTONICA

SERVICE MANUAL

STEREO CONTROL AMPLIFIER

MODEL
SO-9100H
(Silver Panel)
SO-9100HB
(Brown Panel)

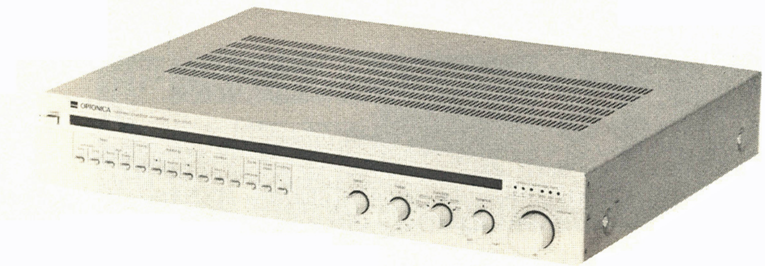


PHOTO : SO-9100H

The SO-9100H and SO-9100HB are quite the same except for the Panel and knobs different in color between them.
So, this Service Manual is prepared refering to the SO-9100H alone: the difference of the SO-9100HB against it can be made out with a reference to "DIFFERENTIAL PARTS LIST" at the end of PARTS LIST.

In the interests of user-safety the set should be restored to its original condition and only parts identical to those specified be used.

SPECIFICATIONS

GENERAL DESCRIPTION

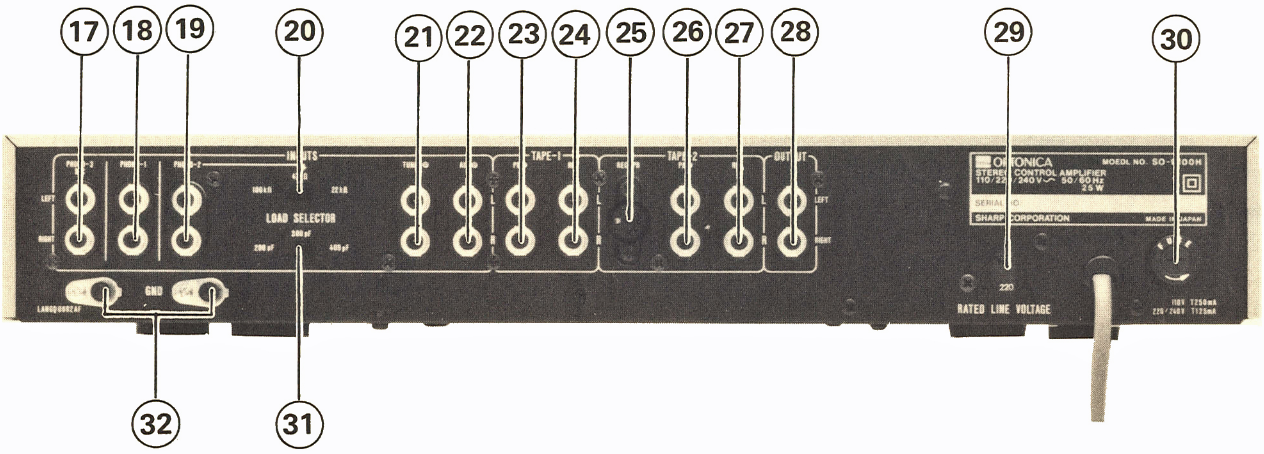
Power source:	A.C. 110/220/240V, 50/60Hz
Power consumption:	25 W
Semiconductors:	16-Transistors 82-FETs 21-Diodes 18-LEDs
Dimensions:	Width; 430mm (16-15/16 inch) Height; 75mm (2-31/32 inch) Depth; 382mm (15-1/16 inch)
Weight:	6.5kg (14.4 lbs.)
Circuit type:	
Head amplifier for moving coil type cartridge;	All FET, ICL (input capacitorless), 2-stage differential amplifier, DC amplifier
Equalizer;	ICL (input capacitorless), all FET differential amplifier, complementary final stage, dual power supply, DC amplifier
Tone control;	ICL (input capacitorless), all FET differential amplifier, dual power supply, DC amplifier
Input sensitivity and input impedance:	
PHONO 1;	3mV/47K ohms
PHONO 2;	3mV/22K ohms, 47K ohms, 100K ohms 200pF, 300pF, 400pF
PHONO 3;	0.3mV/100 ohms
AUX;	150mV/47K ohms
TUNER;	150mV/47K ohms
TAPE PB 1 and 2;	150mV/47K ohms
TAPE PB (DIN socket);	150mV/47K ohms

Allowable maximum input for equalizer:	
PHONO 1 and 2;	300mV (RMS, 1kHz)
PHONO 3;	27mV
RIAA curve deviation:	±0.2dB (20Hz to 20kHz)
Frequency response:	5Hz to 80kHz $^{+0dB}_{-2dB}$ (TUNER, AUX, TAPE PB)
Tone control:	Bass; ±10dB at 100Hz Treble; ±10dB at 20kHz
Low filter:	−3dB at 15Hz, 6dB/octave −3dB at 30Hz, 6dB/octave
High filter:	−3dB at 8kHz, 6dB/octave −3dB at 15kHz, 6dB/octave
Loudness contour:	+7.0dB at 100Hz +4dB at 10kHz
Audio muting:	−20dB
Signal to noise ratio:	(using IHF "A" network) PHONO 1 and 2; 84dB PHONO 3; 70dB TAPE, AUX or TUNER; 100dB
Output level and loaded impedance:	
REC 1 and 2;	150mV
REC (DIN socket);	30mV/82K ohms
Output:	1V/22K ohms
Harmonic Distortion:	
PHONO 1 and 2;	0.003% at 10V, 20Hz – 20kHz
TUNER and AUX;	0.003% at 5V, 20Hz – 20kHz
Intermodulation:	0.002% at 3V

Specifications of this model are subject to change without prior notice.

SHARP CORPORATION OSAKA, JAPAN

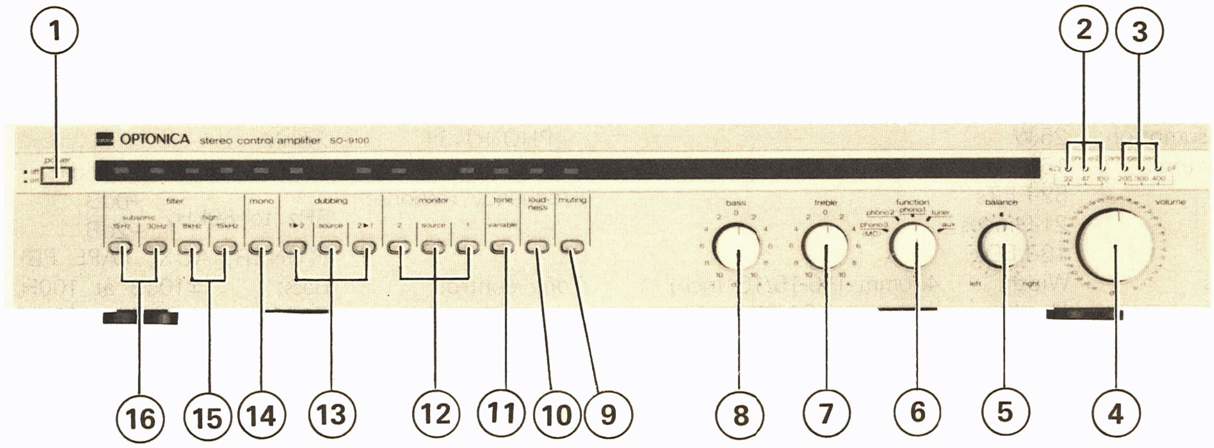
LAYOUT OF PARTS



⑰
⑱
⑲
⑳
㉑
㉒
㉓
㉔
㉕
㉖
㉗
㉘
㉙
㉚
IN UTS
LOAD SELECTOR
TAPE-1
TAP 2
OUT UT
LEFT
RIGHT
GND
OPTONICA
STEREO CONTROL AMPLIFIER
SHARP CORPORATION
RATED LINE VOLTAGE
㉜
㉛

PHOTO : SO-9100H

Figure 2–1 FRONT PARTS



①
②
③
OPTONICA stereo control amplifier SO-9100
power
filter
mono
dubbing
monitor
tone
loudness
muting
bass
treble
function
balance
volume
⑯
⑮
⑭
⑬
⑫
⑪
⑩
⑨
⑧
⑦
⑥
⑤
④

PHOTO : SO-9100H

Figure 2–2 REAR PARTS

① Power On/Off switch
② Impedance indicator
③ Capacitance indicator
④ Volume control
⑤ Balance control
⑥ Function selector
⑦ Treble control
⑧ Bass control
⑨ Audio muting
⑩ Loudness contour
⑪ Tone control circuit on/off
⑫ Tape monitor selector
⑬ Tape dubbing selector
⑭ Mono switch
⑮ High filter
⑯ Subsonic filter

⑰ Phono 3 input sockets
⑱ Phono 1 input sockets
⑲ Phono 2 input sockets
⑳ Impedance selector for phono 2 input
㉑ Tuner input sockets
㉒ Auxiliary input sockets
㉓ Tape 1 input sockets
㉔ Tape 1 output sockets
㉕ Tape 2 record/playback socket
㉖ Tape 2 input sockets
㉗ Tape 2 output sockets
㉘ Pre-amplifier outputs
㉙ Mains voltage selector
㉚ Fuse holder
㉛ Capacitance selector for phono 2 input
㉜ Chassis earthing terminals

DISASSEMBLY

Prior to removing the cabinet, be sure to draw the mains supply plug from an wall outlet and disconnect all of connection cords at the rear of the set.

A CABINET REMOVAL

1. Remove the 4 screws retaining the cabinet at the right and left surfaces. (Refer to Figure 3–1)
2. Shift the cabinet backward about 5 mm.
3. Giving a force to the bottom of cabinet, hold it up and remove. (Refer to Figure 3–1)

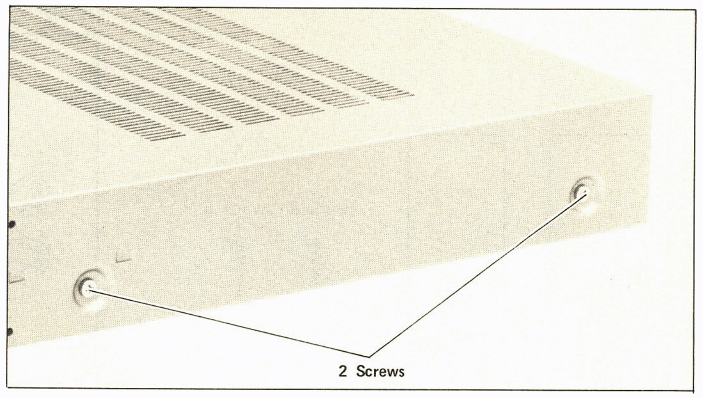


Figure 3–1

B BOTTOM LID REMOVAL

1. Turn the set over and remove the 14 screws retaining the bottom lid, then the bottom lid can be detached by holding it up. (Refer to Figure 3–2)

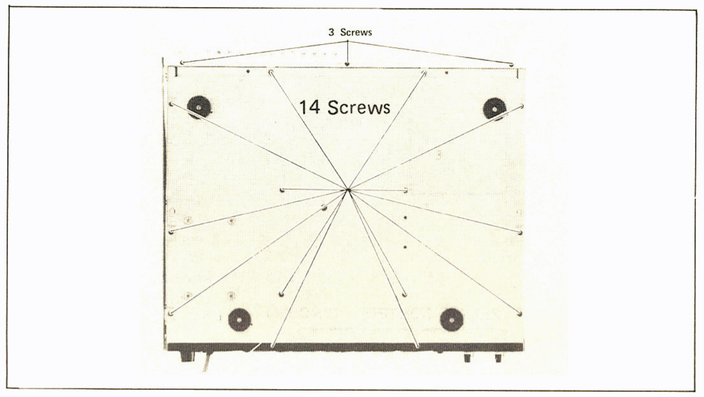

3 Screws
14 Screws

Figure 3–2

C FRONT PANEL REMOVAL

1. Pull out the 5 knobs (Bass control/Treble control/Function selector/Balance control/Volume control) from the front panel. (Refer to Figure 3–3)
2. Remove the 5 screws and the push rivet retaining the front panel, then the front panel can be detached by pulling it toward you. (Refer to Figures 3–2 and 3–3)

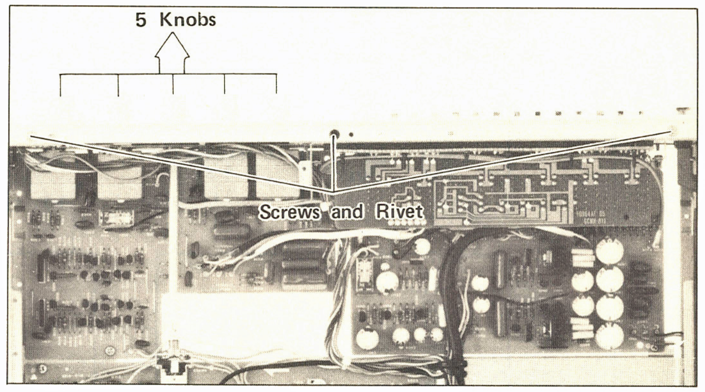

5 Knobs
Screws and Rivet

Figure 3–3

AC MAINS VOLTAGE SELECTION

Check the preset AC mains voltage before plugging the mains supply lead to a mains outlet. If the setting is defferent from that of your local mains supply voltage, the voltage selector must be re-set as follows. Rotate the voltage selector by using a screwdriver so that your local voltage number can be seen in the window.

When the AC mains voltage is to be set at 110V use a fuse of T250mA. In other voltages 220V or 240V use a fuse of T125mA.

1. Disconnect the AC cord plug from the wall outlet in order to prevent an electric shock.
2. Remove the fuse holder by turning it counterclockwise.
3. Replace the fuse with another one.
4. Replace the fuse holder to its original position.

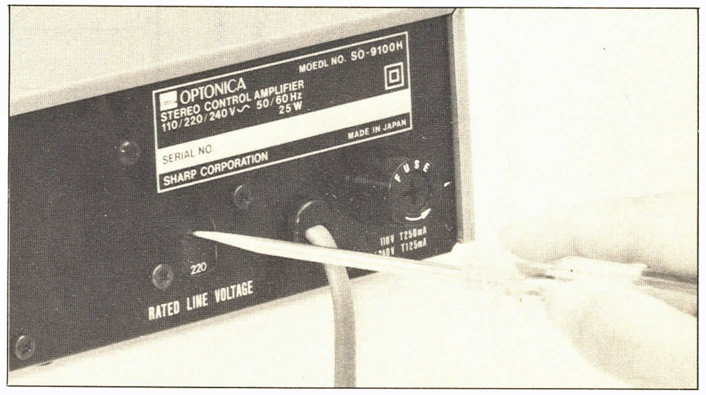

OPTONICA
STEREO CONTROL AMPLIFIER
110/220/240V~ 50/60Hz
25W
MOEDL NO. SO-9100H
MADE IN JAPAN
SERIAL NO
SHARP CORPORATION
FUSE
110V T250mA
T125mA
220
RATED LINE VOLTAGE

Figure 3–4

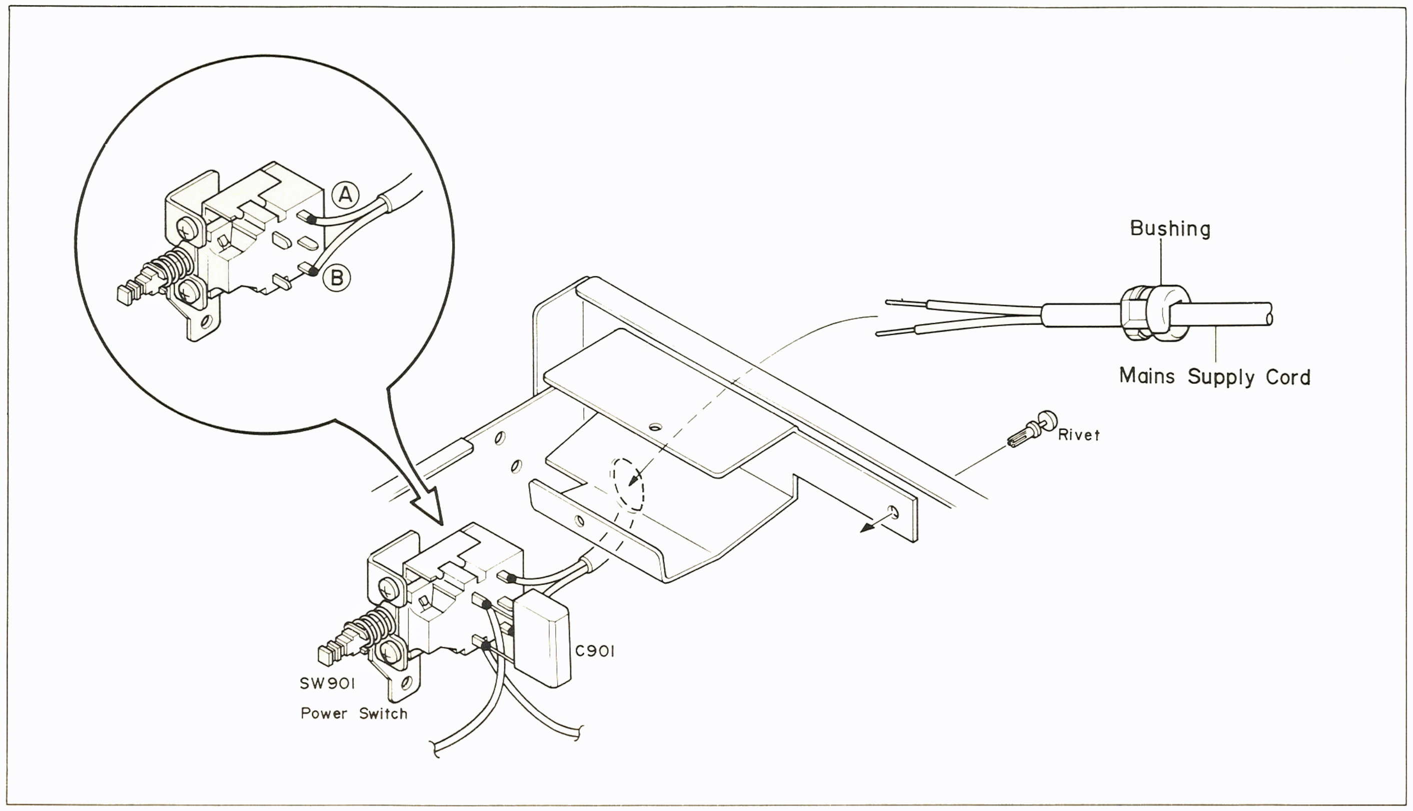

Ⓐ
Ⓑ
Bushing
Mains Supply Cord
Rivet
C901
SW901
Power Switch

Figure 4–1 MAINS SUPPLY CORD WIRING CONNECTION

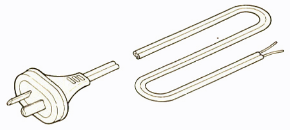
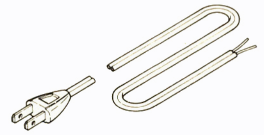
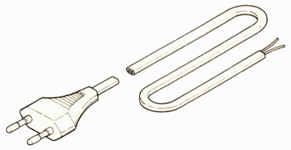
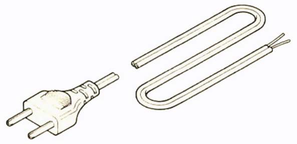
Mains supply cord	Bushing	Connection		Plug
		Ⓐ	Ⓑ	
QACCL0001AFZZ	LBSHC0007AFZZ	Brand stamp	Projection stripe	
QACCZ0002TA0F	LBSHC0007AFZZ	Brown	Brown	
QACCV0001AGZZ	LBSHC0004AGZZ	Blue	Brown	
QACCZ0053AF00	LBSHC0007AFZZ	Black	Black	

TABLE 1 MAINS SUPPLY CORD WIRING CONNECTION

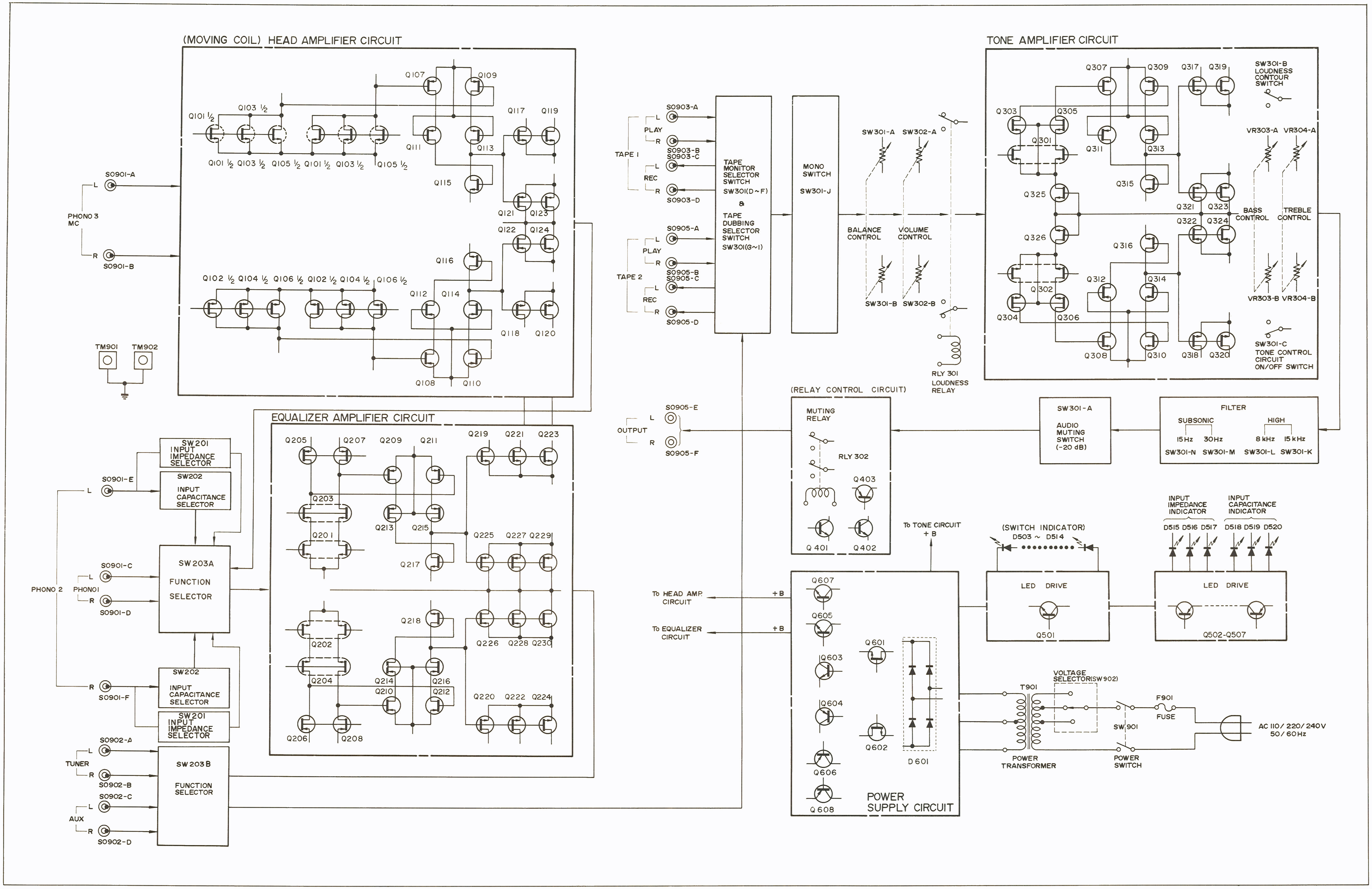

(MOVING COIL) HEAD AMPLIFIER CIRCUIT
Q101 ½ Q103 ½ Q105 ½ Q101 ½ Q103 ½ Q105 ½
Q102 ½ Q104 ½ Q106 ½ Q102 ½ Q104 ½ Q106 ½
Q107 Q109 Q111 Q113 Q115 Q116 Q112 Q114 Q108 Q110
Q117 Q119 Q121 Q123 Q122 Q124 Q118 Q120
S0901-A
S0901-B
PHONO 3 MC
L
R
TM901 TM902
EQUALIZER AMPLIFIER CIRCUIT
Q205 Q207 Q209 Q211 Q219 Q221 Q223
Q203 Q201 Q213 Q215 Q217
Q225 Q227 Q229
Q202 Q204 Q218 Q214 Q216 Q210 Q212
Q226 Q228 Q230
Q220 Q222 Q224
Q206 Q208
SW201 INPUT IMPEDANCE SELECTOR
SW202 INPUT CAPACITANCE SELECTOR
S0901-E
S0901-C
S0901-D
S0901-F
PHONO 2
PHONO1
SW203A FUNCTION SELECTOR
SW202 INPUT CAPACITANCE SELECTOR
SW201 INPUT IMPEDANCE SELECTOR
S0902-A
TUNER
S0902-B
S0902-C
AUX
S0902-D
SW203B FUNCTION SELECTOR
S0903-A
PLAY
TAPE 1
REC
S0903-B
S0903-C
S0903-D
S0905-A
TAPE 2
S0905-B
S0905-C
S0905-D
TAPE MONITOR SELECTOR SWITCH SW301(D~F)
&
TAPE DUBBING SELECTOR SWITCH SW301(G~I)
MONO SWITCH SW301-J
SW301-A SW302-A
BALANCE CONTROL
VOLUME CONTROL
SW301-B SW302-B
RLY 301 LOUDNESS RELAY
TONE AMPLIFIER CIRCUIT
Q307 Q309 Q317 Q319
Q303 Q305 Q301 Q311 Q313 Q315
Q325 Q321 Q323 Q322 Q324 Q326 Q316
Q302 Q312 Q314
Q304 Q306 Q308 Q310 Q318 Q320
SW301-B LOUDNESS CONTOUR SWITCH
VR303-A VR304-A
BASS CONTROL
TREBLE CONTROL
VR303-B VR304-B
SW301-C TONE CONTROL CIRCUIT ON/OFF SWITCH
FILTER
SUBSONIC
HIGH
15Hz 30Hz 8kHz 15kHz
SW301-N SW301-M SW301-L SW301-K
SW301-A AUDIO MUTING SWITCH (-20 dB)
(RELAY CONTROL CIRCUIT)
MUTING RELAY
RLY 302
Q403 Q401 Q402
S0905-E
S0905-F
OUTPUT
To TONE CIRCUIT +B
(SWITCH INDICATOR)
D503 ~ D514
LED DRIVE
Q501
INPUT IMPEDANCE INDICATOR
INPUT CAPACITANCE INDICATOR
D515 D516 D517 D518 D519 D520
LED DRIVE
Q502-Q507
To HEAD AMP. CIRCUIT
To EQUALIZER CIRCUIT
+B
Q607 Q605 Q603 Q604 Q606 Q608 Q601 Q602
D601
POWER SUPPLY CIRCUIT
T901
POWER TRANSFORMER
VOLTAGE SELECTOR(SW902)
F901
FUSE
SW901
POWER SWITCH
AC 110/ 220/ 240V 50/ 60Hz

Figure 5 BLOCK DIAGRAM

CIRCUIT DESCRIPTION

MC (MOVING COIL) HEAD AMPLIFIER CIRCUIT

The moving coil head amplifier circuit is a DC-operated one that is composed of two differential amplification stages and one cascode, amplification stage, with a parallel push-pull system at the output stage. The differential amplifier at the first stage consists of FETs (Q101 thru Q106) and these dual type of FETs provide too low noise characteristic and high gm values: theoretically, the possible noise of this amplifier is reduced by about 5 dB compared with the set using only one FET. The resistors (R109 and R110) and capacitors (C105 and C106) are intended for a phase compensation. The second-stage differential amplifier is also formed by FETs (Q107 thru Q110). Meanwhile FETs (Q111 thru Q114) are a cascode amplifier aimed at increasing the output impedance as well as decreasing the feedback capacitance.

Besides FETs (Q117 to Q124) are an output amplifier and here is a parallel push-pull arrangement of P channel (Q121 to Q124) and N channel (Q117 to Q120) so that this amplifier can resist a larger load than it could without this design. And this output stage is designed to operate on the self-biasing so as to suppress a variation of the output characteristics due to quality dispersion of the FETs employed.

FETs (Q115 and Q116) are for a phase conversion.

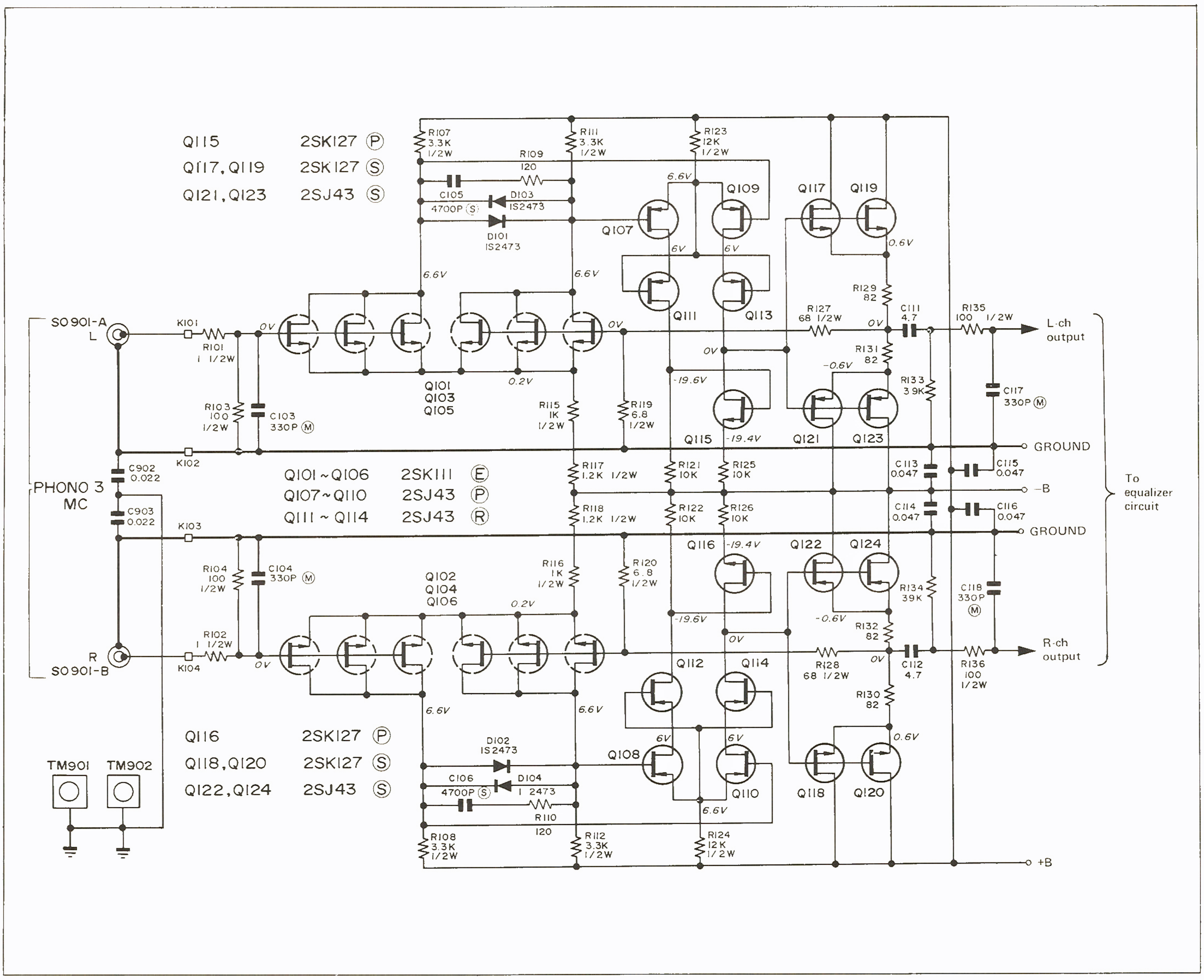

Q115 2SK127 Ⓟ
Q117, Q119 2SK127 Ⓢ
Q121, Q123 2SJ43 Ⓢ
R107 3.3K 1/2W
R111 3.3K 1/2W
R123 12K 1/2W
R109 120
C105 4700P Ⓢ
D103 1S2473
D101 1S2473
Q107
Q109
Q117
Q119
6.6V
6V
0.6V
R129 82
Q111
Q113
R127 68 1/2W
C111 4.7
R135 100 1/2W
L-ch output
SO901-A L
K101
R101 1 1/2W
0V
R131 82
-0.6V
R133 39K
C117 330P Ⓜ
R103 100 1/2W
C103 330P Ⓜ
Q101 Q103 Q105
0.2V
R115 1K 1/2W
R119 6.8 1/2W
-19.6V
Q115
-19.4V
Q121
Q123
GROUND
K102
C902 0.022
PHONO 3 MC
C903 0.022
K103
Q101~Q106 2SK111 Ⓔ
Q107~Q110 2SJ43 Ⓟ
Q111~Q114 2SJ43 Ⓡ
R117 1.2K 1/2W
R121 10K
R125 10K
C113 0.047
C115 0.047
-B
To equalizer circuit
R118 1.2K 1/2W
R122 10K
R126 10K
C114 0.047
C116 0.047
GROUND
Q116
Q122
Q124
R104 100 1/2W
C104 330P Ⓜ
Q102 Q104 Q106
R116 1K 1/2W
R120 6.8 1/2W
R134 39K
C118 330P Ⓜ
R132 82
R102 1 1/2W
R SO901-B
K104
Q112
Q114
R128 68 1/2W
C112 4.7
R136 100 1/2W
R-ch output
R130 82
TM901
TM902
Q116 2SK127 Ⓟ
Q118, Q120 2SK127 Ⓢ
Q122, Q124 2SJ43 Ⓢ
D102 1S2473
Q108
Q110
Q118
Q120
C106 4700P Ⓢ
D104 1 2473
R110 120
R108 3.3K 1/2W
R112 3.3K 1/2W
R124 12K 1/2W
+B

Figure 7

■ EQUALIZER AMPLIFIER CIRCUIT

This equalizer amplifier circuit is a DC-operated one that consists of two differential amplification stages and one cascode amplification stage, with a triple-push-pull system at the output. The first-stage amplifier is composed of FETs (Q201 and Q202) and these two dual type of FETs can provide an effect to reduce noise appearance. FETs (Q203 and Q204) are a cascode amplifier.

* In-phase feedback constant current circuit

The constant current circuit comprises FETs (Q205 to Q208) and bias caused by it is applied via the resistors (R227 and R228) to the source of the second-stage differential amplifier consisting of FETs (Q209, Q211, Q210, Q212). Part of the output of this differential amplifier is fed back to the preceeding constant current circuit: thus, in-phase hum, noise and other undesired components due to a variation of the power supply are all eliminated, with the amplification hardly affected by them.

FETs (Q219 to Q230) are an output amplifier having a design of triple-push-pull amplification.

The semi-variable resistors (VR201 and VR202) are used to properly regulate the amount of DC voltage.

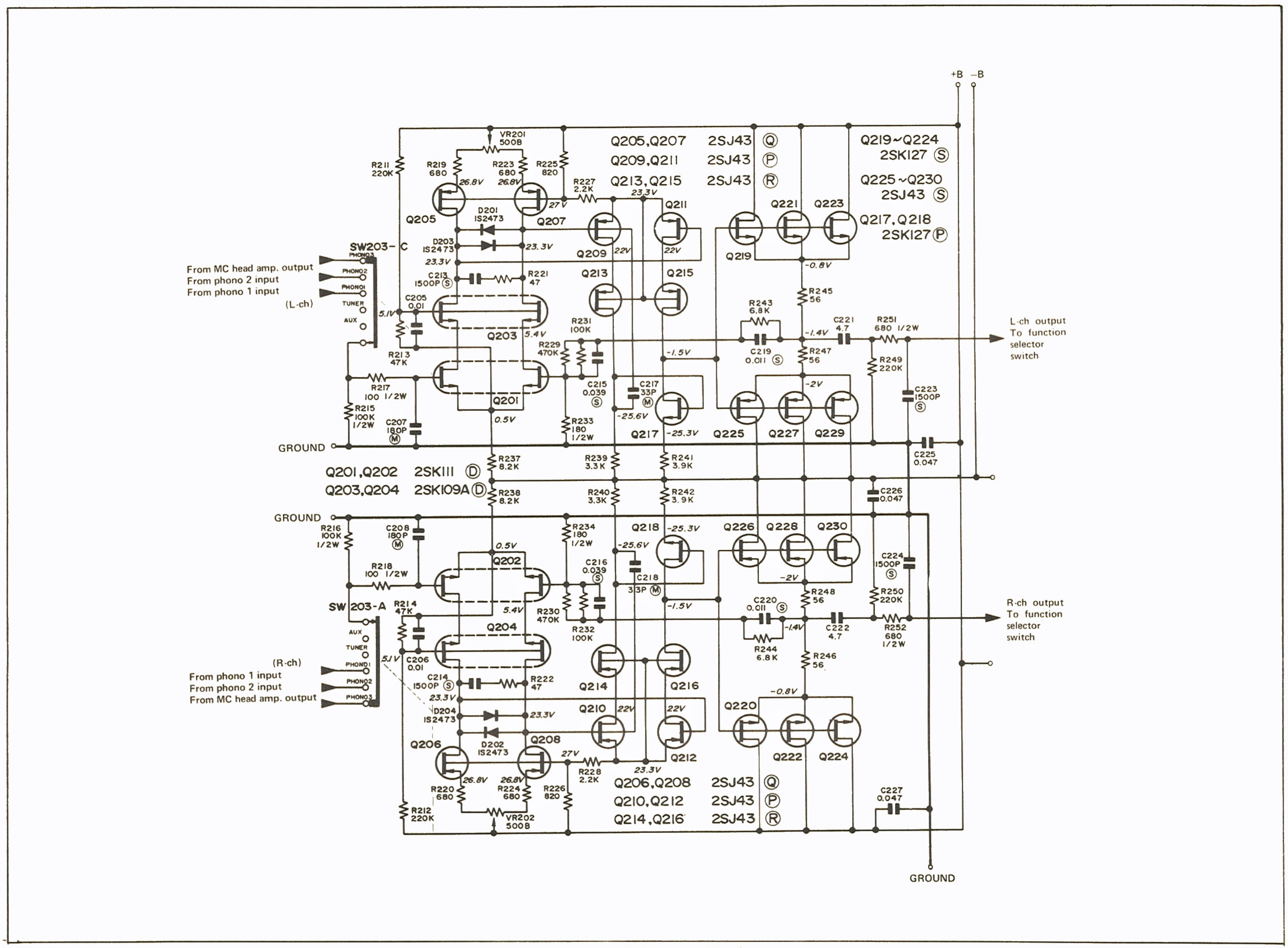
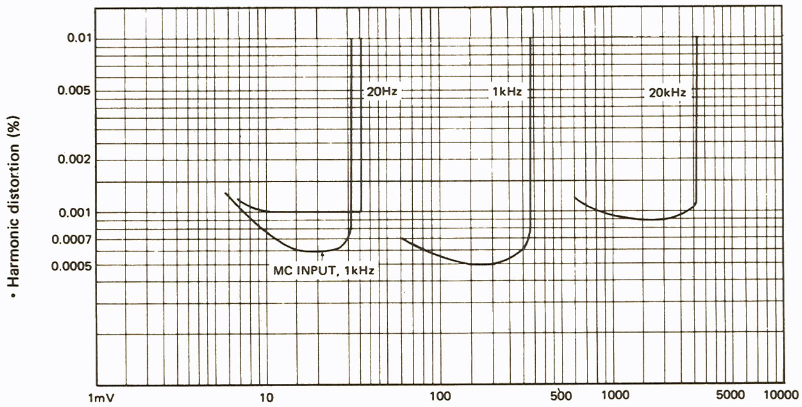

+B
-B
Q205,Q207 2SJ43 Ⓠ
Q209,Q211 2SJ43 Ⓟ
Q213,Q215 2SJ43 Ⓡ
Q219~Q224 2SK127 Ⓢ
Q225~Q230 2SJ43 Ⓢ
Q217,Q218 2SK127 Ⓟ
Q201,Q202 2SK111 Ⓓ
Q203,Q204 2SK109A Ⓓ
Q206,Q208 2SJ43 Ⓠ
Q210,Q212 2SJ43 Ⓟ
Q214,Q216 2SJ43 Ⓡ
VR201 500B
VR202 500B
SW203-C
SW203-A
From MC head amp. output
From phono 2 input
From phono 1 input
(L-ch)
(R-ch)
PHONO3
PHONO2
PHONO1
TUNER
AUX
GROUND
L-ch output To function selector switch
R-ch output To function selector switch

Figure 8—1



• Input vs Distortion factor characteristic of equalizer amplifier • Input (mV)

Figure 8—2

■ TONE AMPLIFIER CIRCUIT

This tone amplifier circuit is a DC-operated one that is composed of two differential amplification stages and two cascode amplification stages, with a parallel push-pull system at the output stage.

The differential amplifier at the first stage comprises FETs (Q301 and Q302) and these tow dual type of FETs enable a greater reduction of noise appearance. FETs (Q303 to Q306) refer to the first stage cascode amplifier; FETs (Q307 to Q310), to the second-stage differential amplifier; FETs (Q311 to Q314), to the second-stage cascode amplifier.

Besides FETs (Q317 to Q324) are an output amplifier and here is a parallel push-pull arrangement of P channel (Q321 to Q324) and N channel (Q317 to Q320) so that this amplifier can resist larger load than it could without this design.

The capacitors (C313 and C314) are intended for a feedback operation, thus for stabilization of the entire circuitry operation.

FETs (Q325 and Q326) are used to properly regulate the amount of the produced direct current (approx. 2 mA).

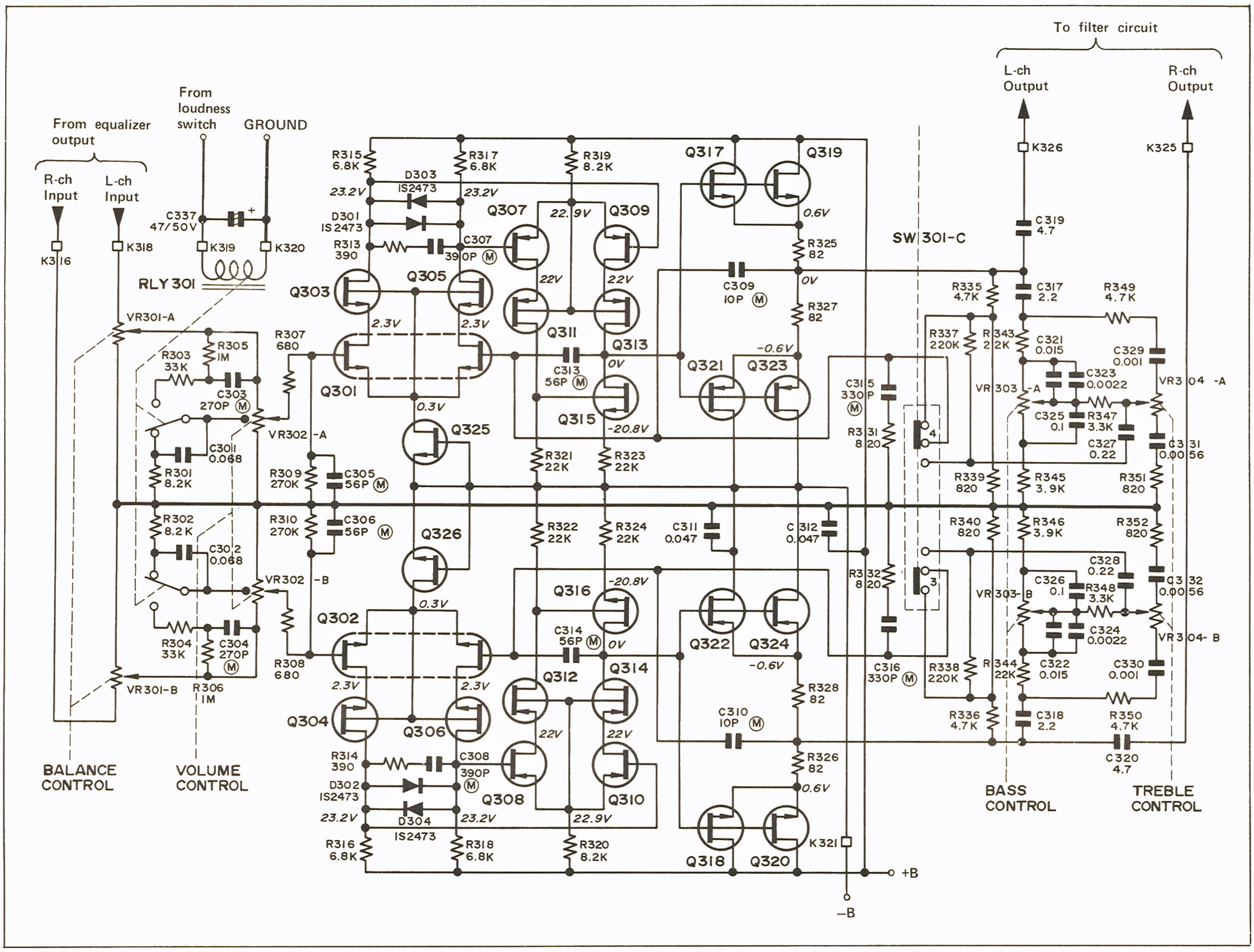

From equalizer output
R-ch Input
L-ch Input
From loudness switch
GROUND
To filter circuit
L-ch Output
R-ch Output
K316
K318
K319
K320
K325
K326
K321
C337 47/50V
RLY301
VR301-A
VR301-B
VR302-A
VR302-B
SW301-C
VR303-A
VR303-B
VR304-A
VR304-B
Q301
Q302
Q303
Q304
Q305
Q306
Q307
Q308
Q309
Q310
Q311
Q312
Q313
Q314
Q315
Q316
Q317
Q318
Q319
Q320
Q321
Q322
Q323
Q324
Q325
Q326
D301 IS2473
D302 IS2473
D303 IS2473
D304 IS2473
R315 6.8K
R317 6.8K
R319 8.2K
R316 6.8K
R318 6.8K
R320 8.2K
R313 390
R314 390
C307 390P
C308 390P
R307 680
R308 680
R309 270K
R310 270K
C305 56P
C306 56P
R303 33K
R304 33K
R305 1M
R306 1M
C303 270P
C304 270P
C301 0.068
C302 0.068
R301 8.2K
R302 8.2K
C313 56P
C314 56P
R321 22K
R322 22K
R323 22K
R324 22K
C311 0.047
C312 0.047
C309 10P
C310 10P
R325 82
R326 82
R327 82
R328 82
C315 330P
C316 330P
R331 820
R332 820
R335 4.7K
R336 4.7K
R337 220K
R338 220K
R343 2.2K
R344 22K
C319 4.7
C320 4.7
C317 2.2
C318 2.2
C321 0.015
C322 0.015
C323 0.0022
C324 0.0022
C325 0.1
C326 0.1
R347 3.3K
R348 3.3K
C327 0.22
C328 0.22
R349 4.7K
R350 4.7K
C329 0.001
C330 0.001
C331 0.0056
C332 0.0056
R339 820
R340 820
R345 3.9K
R346 3.9K
R351 820
R352 820
23.2V
22.9V
22V
2.3V
0.3V
0V
0.6V
-0.6V
-20.8V
+B
-B
BALANCE CONTROL
VOLUME CONTROL
BASS CONTROL
TREBLE CONTROL

Figure 9

■ RELAY CONTROL CIRCUIT

The relay control circuit is aimed at driving the muting relay (RY302). The muting relay is put in parallel with the signal processing circuits, but not in series with them, in order to avoid a degradation of the tone quality.

When the power switch (SW901) is set to "on" position, a power is caused by the constant voltage circuit and it is applied via the resistor (R405) to the capacitor (C404) so that the potential at the base of the transistor (Q402) will eventually increase up to approx. 1.2 V: then this transistor is turned on to cause its collector current, which increases a voltage across the resistor (R406); thus, the transistor (Q403), in turn, is turned on to bring about a current to the coil of the relay, so that the switch of the relay becomes open: the result is that the output so far grounded through the relay is impressed onto the output terminal (SO906).

On the other hand when the power switch is set to "off" position, the potential at the contact between the diode (D401) and capacitor (C402) gets positive making the transistor (Q401) turn on. Thus, the capacitor (C401) is discharged so as to turn off the transistor Q402 and Q403, resulting in that a current running to the relay's coil is stopped so that the switch of the relay is closed. This way, the output so far applied to the output terminal is again grounded through the relay.

■ LED DRIVE CIRCUIT

The LED drive circuit is intended to put the indicator LEDs (D503 to D514) into action and it is also a constant current circuit making use of a constant voltage caused at the ends of the diodes (D501 and D502).

An electrolytic capacitor (C502) is inserted between the collector of the transistor (Q501) and earth, in order for the output voltage to be maintained rather normal however the quantity of LEDs lighting up may be changed. The bypass resistor (R503) is aimed at a swifter putting off of LEDs when the power switch is turned off.

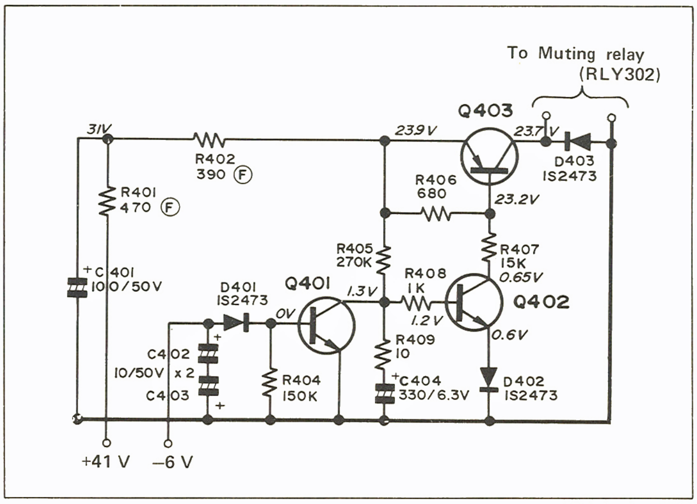

To Muting relay
(RLY302)
Q403
31V
23.9V
23.7V
D403
IS2473
R402
390 Ⓕ
R401
470 Ⓕ
R406
680
23.2V
R405
270K
R407
15K
0.65V
R408
1K
+C401
100/50V
D401
IS2473
Q401
0V
1.3V
Q402
1.2V
0.6V
R409
10
C402
10/50V x 2
C403
R404
150K
+C404
330/6.3V
D402
IS2473
+41 V
−6 V

Figure 10—1

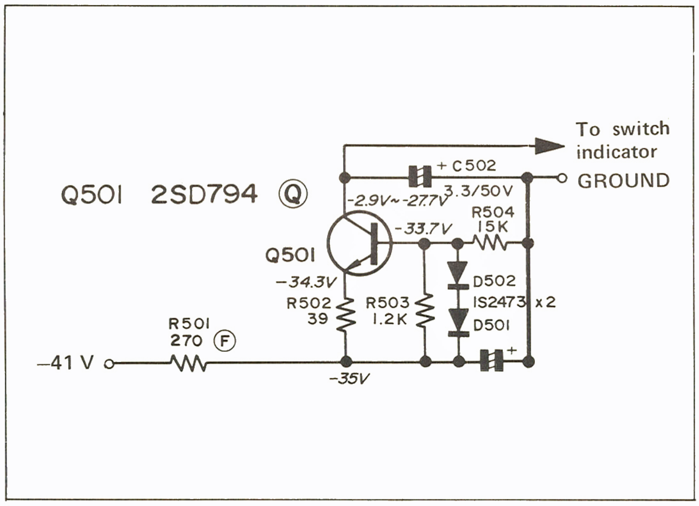

Q501 2SD794 Ⓠ
To switch indicator
+ C502
3.3/50V
GROUND
-2.9V~-27.7V
-33.7V
R504
15K
Q501
-34.3V
D502
IS2473 x2
D501
R502
39
R503
1.2K
R501
270 Ⓕ
−41 V
-35V

Figure 10—2

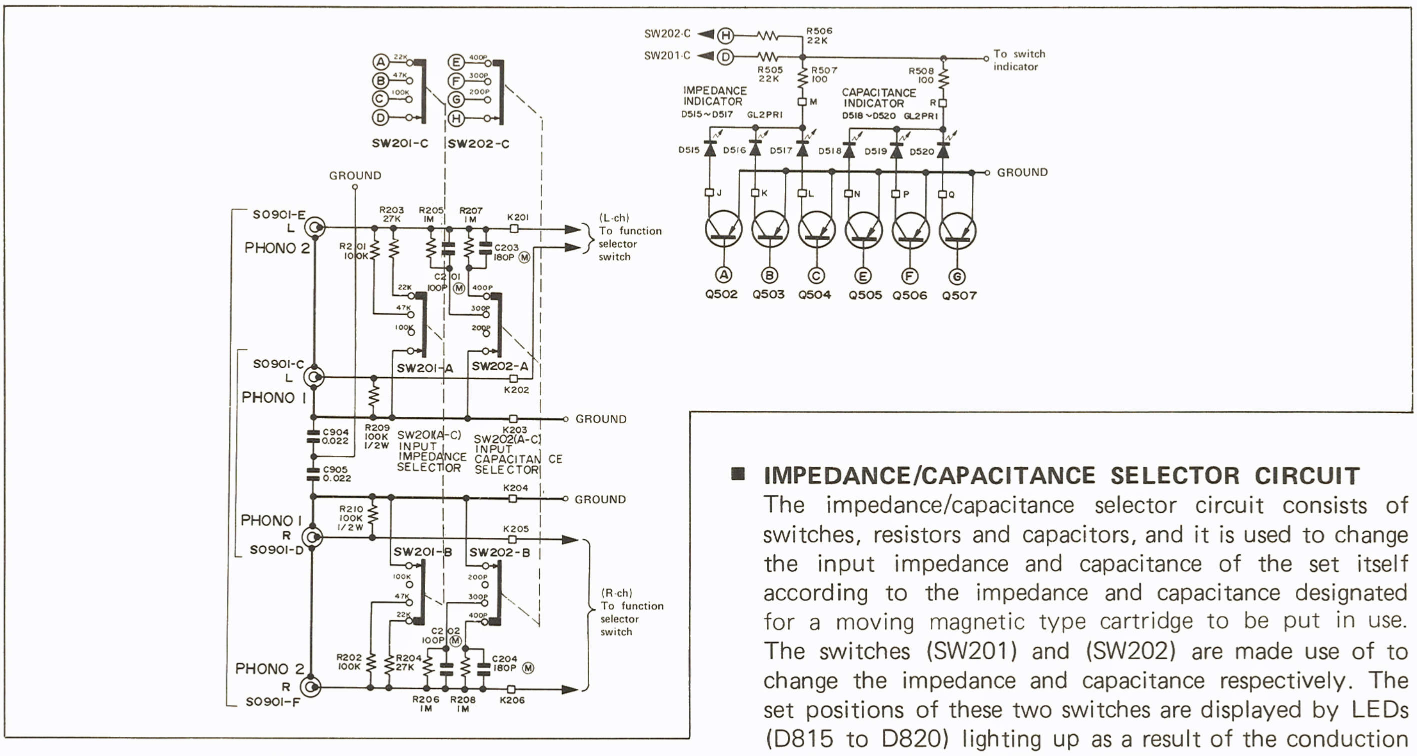

SW201-C
SW202-C
GROUND
SO901-E
L
PHONO 2
R203 27K
R205 1M
R207 1M
K201
R201 100K
C203 180P Ⓜ
C201 100P Ⓜ
(L-ch)
To function selector switch
SO901-C
L
PHONO 1
SW201-A
SW202-A
K202
GROUND
C904 0.022
R209 100K 1/2W
SW201(A-C) INPUT IMPEDANCE SELECTOR
K203
SW202(A-C) INPUT CAPACITANCE SELECTOR
C905 0.022
K204
GROUND
PHONO 1
R
SO901-D
R210 100K 1/2W
K205
SW201-B
SW202-B
(R-ch)
To function selector switch
C202 100P Ⓜ
PHONO 2
R
SO901-F
R202 100K
R204 27K
C204 180P Ⓜ
R206 1M
R208 1M
K206
SW202-C
SW201-C
R506 22K
R505 22K
R507 100
R508 100
To switch indicator
IMPEDANCE INDICATOR D515~D517 GL2PR1
CAPACITANCE INDICATOR D518~D520 GL2PR1
D515
D516
D517
D518
D519
D520
GROUND
Q502
Q503
Q504
Q505
Q506
Q507

Figure 10—3

■ IMPEDANCE/CAPACITANCE SELECTOR CIRCUIT

The impedance/capacitance selector circuit consists of switches, resistors and capacitors, and it is used to change the input impedance and capacitance of the set itself according to the impedance and capacitance designated for a moving magnetic type cartridge to be put in use. The switches (SW201) and (SW202) are made use of to change the impedance and capacitance respectively. The set positions of these two switches are displayed by LEDs (D815 to D820) lighting up as a result of the conduction of the transistors (Q502 to Q507).

■ POWER SUPPLY CIRCUIT

AC voltage is taken out of the secondary of the power transformer (T901) and it is fed to the bridge type fullwave rectifier circuit (D601) to undergo its rectification. Then it passes through the smoothing circuit composed of electrolytic capacitors (C609, C607 or C606, C608) and finally it is delivered to the constant voltage circuit. Capacitors (C601 to C604) are adopted to remove switching noises of the rectifier circuit and also noises received from the primary of the power transformer. Other capacitor (C613 or C614) is for the purpose of phase correction.

The positive (+) side of the constant voltage circuit is composed of transistors (Q603, Q605, Q607) and FET (Q601) while its negative (–) side, of transistors (Q604, Q606) and FET (Q602).

Transistor (Q603 or Q604) is for the detection of output voltage, and it operates measuring comparatively the reference voltage regulated by Zener diode (D603 or D604) and the voltage available partly at resistors (R608 and R610, or R609 and R611). For example, if the positive (+) side of output voltage rises, voltage at the base of transistor (Q603) rises so that a current is caused to run from its collector to emitter. And this time, because of a voltage fall in the source side of FET (Q601), voltage at the base of transistor (Q605) falls too. Voltage at the base of transistor (Q607) falls therefore, and the resistance at the collector-emitter junction of transistor (Q607) increases resulting in a fall of the output voltage. With this output voltage fall, the movement reverse to the above-mentioned occurs.

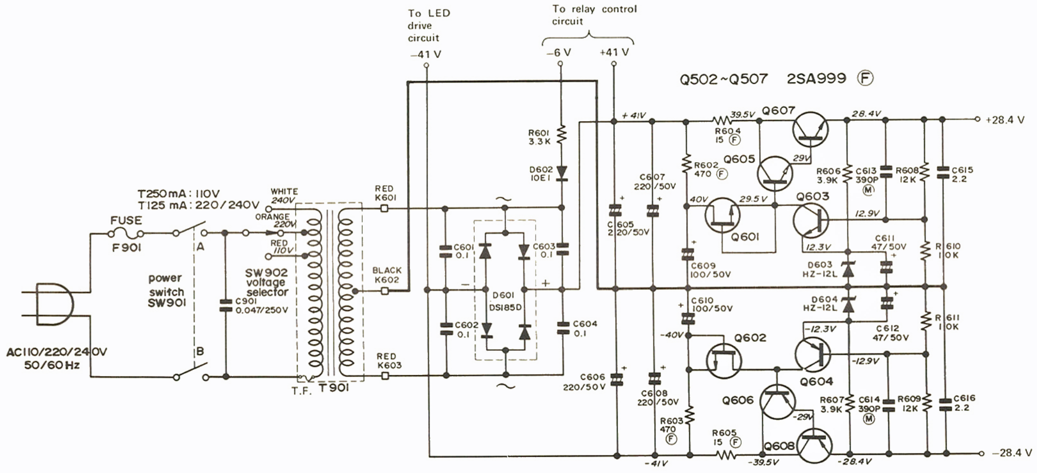

To LED drive circuit
–41 V
To relay control circuit
–6 V
+41 V
Q502~Q507 2SA999 Ⓕ
T250mA : 110V
T125 mA : 220/240V
FUSE
F901
power switch SW901
A
B
AC110/220/240V 50/60Hz
WHITE 240V
ORANGE 220V
RED 110V
SW902 voltage selector
C901 0.047/250V
T.F. T901
RED K601
BLACK K602
RED K603
C601 0.1
C602 0.1
C603 0.1
C604 0.1
D601 DS185D
R601 3.3K
D602 10E1
C605 220/50V
C606 220/50V
C607 220/50V
C608 220/50V
+41V
-41V
R602 470 Ⓕ
R603 470 Ⓕ
R604 15 Ⓕ
R605 15 Ⓕ
39.5V
-39.5V
Q607
Q605
29V
Q603
Q601
40V
29.5V
12.9V
12.3V
C609 100/50V
C610 100/50V
D603 HZ-12L
D604 HZ-12L
C611 47/50V
C612 47/50V
-40V
Q602
Q604
-12.3V
-12.9V
Q606
-29V
Q608
R606 3.9K
R607 3.9K
C613 390P Ⓜ
C614 390P Ⓜ
R608 12K
R609 12K
R610 10K
R611 10K
C615 2.2
C616 2.2
28.4V
-28.4V
+28.4 V
–28.4 V

Figure 11–1

ADJUSTMENT OF EQUALIZER OUTPUT

1. Set the power switch (SW901) to "on" position.
2. Set the volume control to "minimum" position.
3. Check the potential between the test point K212 (or K211) and K501.
   K212 ~ K501 . . . 27.5V ~ 30.0V.
   K211 ~ K501 . . . –27.5V ~ 30.0V.
4. Connect the oscilloscope to the TAPE-1 REC OUT socket (SO903-C; L-ch or SO903-D; R-ch)
5. Connect the signal generator to the PHONO-2 input socket (SO901-E; L-ch or SO901-F; R-ch) and apply signal (1kHz 350mV) to the unit.
6. Adjust the semi-variable resistor (VR201 or VR202) so that the waveform becomes as shown in Figure 11–4.

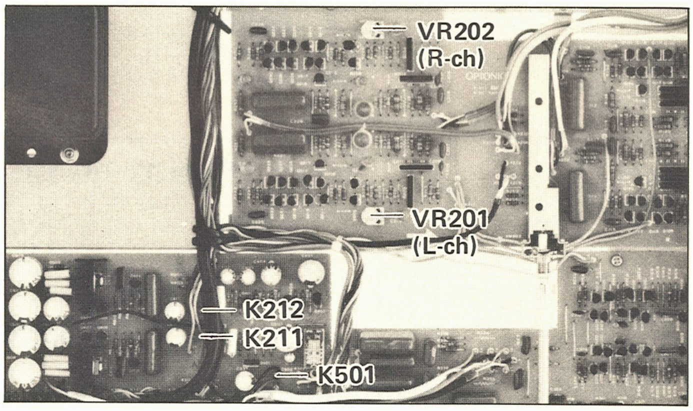

VR202 (R-ch)
VR201 (L-ch)
K212
K211
K501

Figure 11–2

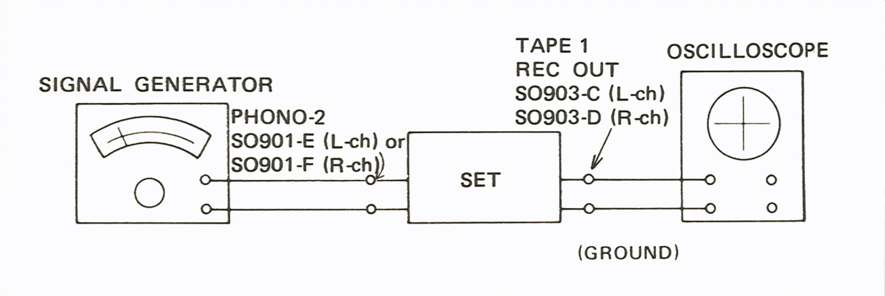

SIGNAL GENERATOR
PHONO-2
SO901-E (L-ch) or
SO901-F (R-ch)
SET
TAPE 1
REC OUT
SO903-C (L-ch)
SO903-D (R-ch)
OSCILLOSCOPE
(GROUND)

Figure 11–3

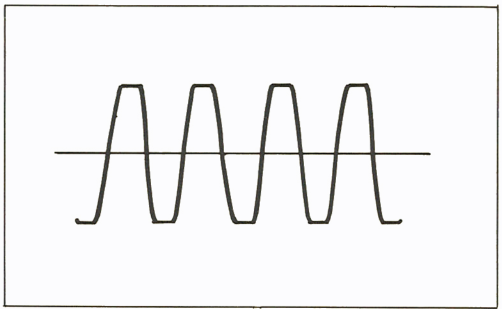


Figure 11–4

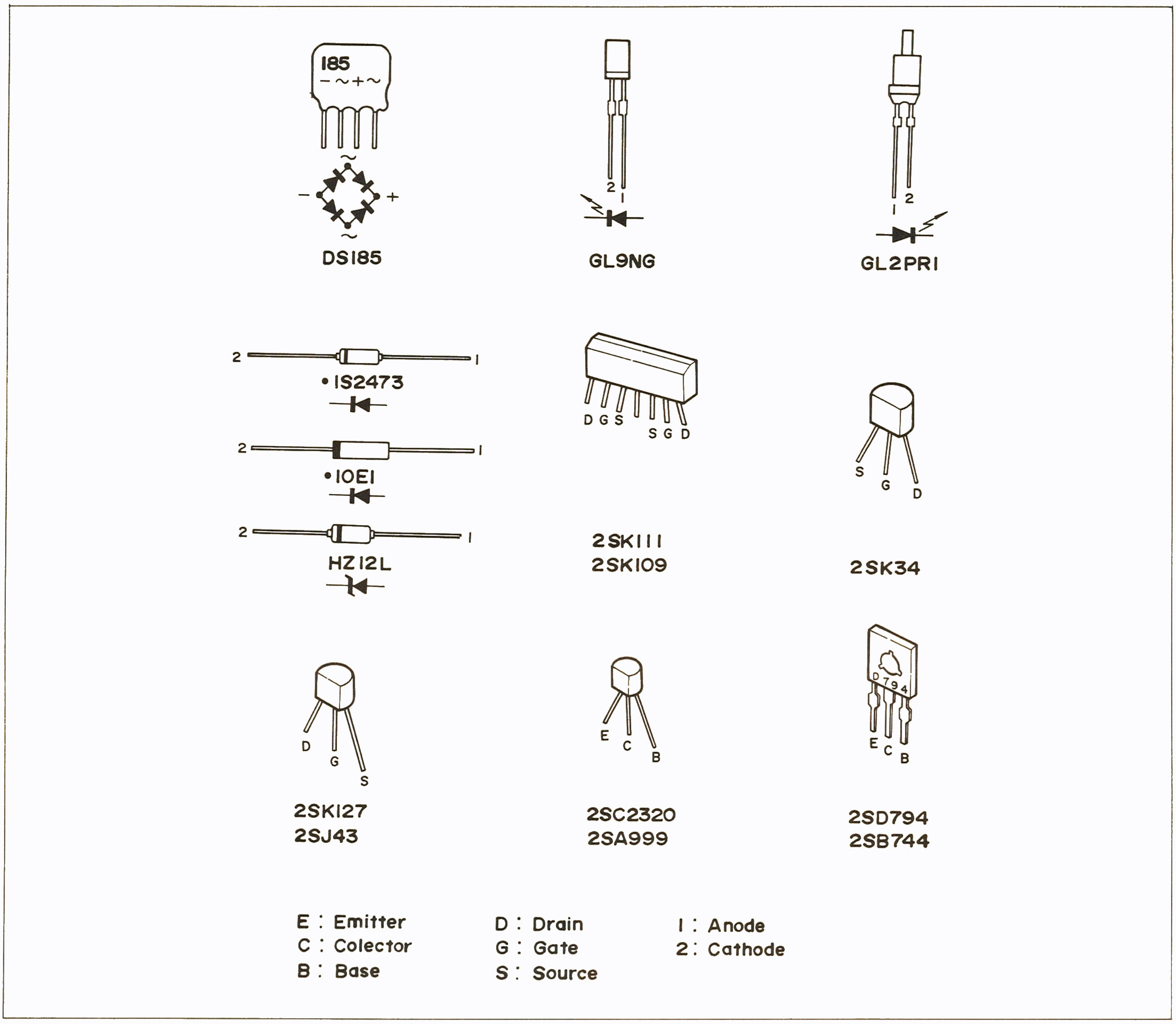
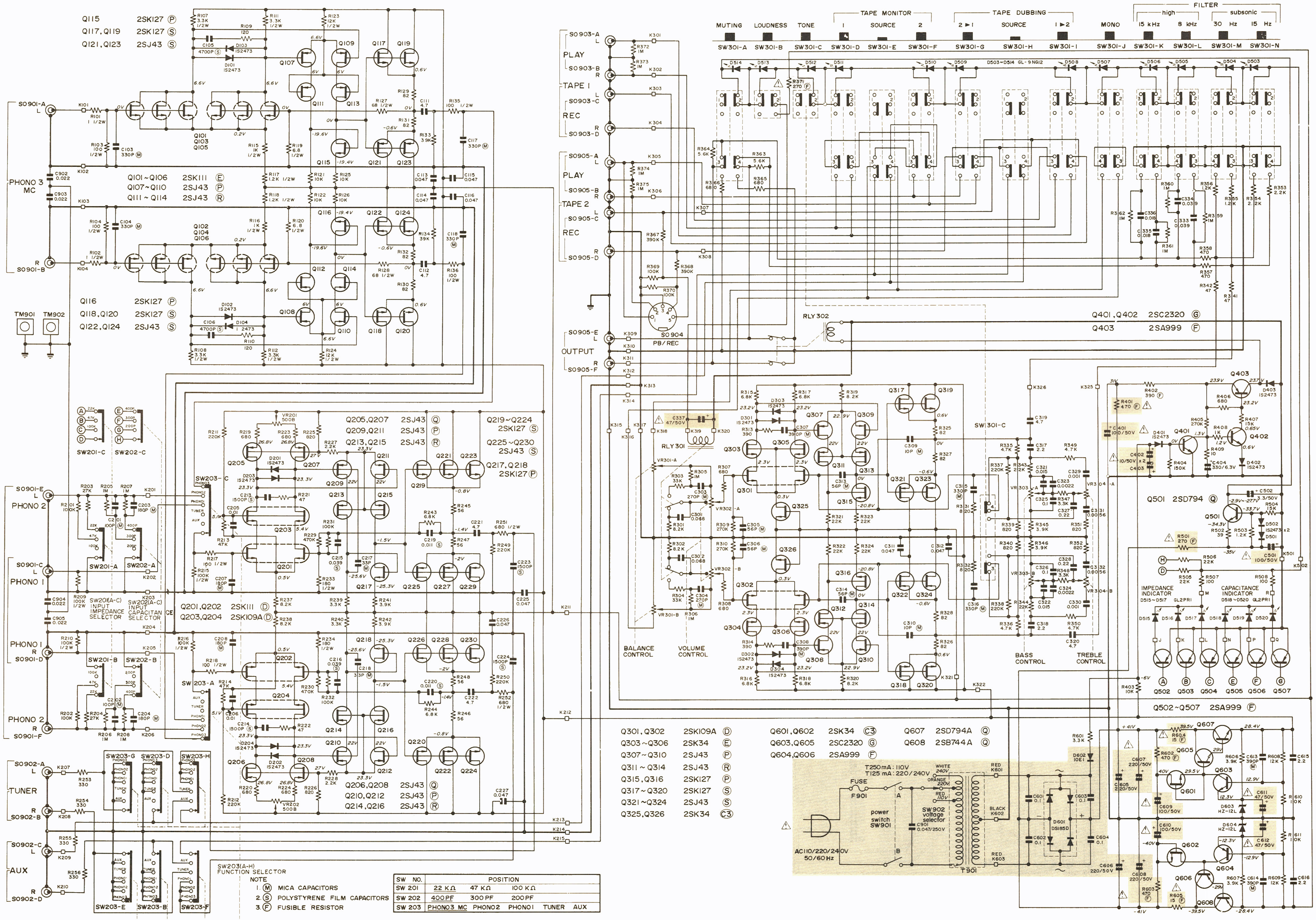

185
− ∼ + ∼
DS185
2
1
GL9NG
1
2
GL2PR1
2
1
• 1S2473
2
1
• 10E1
2
1
HZ12L
D G S
S G D
2SK111
2SK109
S
G
D
2SK34
D
G
S
2SK127
2SJ43
E
C
B
2SC2320
2SA999
D794
E
C
B
2SD794
2SB744
E : Emitter
C : Colector
B : Base
D : Drain
G : Gate
S : Source
1 : Anode
2 : Cathode

Figure 12 TRANSISTORS AND DIODES TYPE

NOTE ON SCHEMATIC DIAGRAM

1. SW201 (A-D); Input PHONO-2 impedance selector switch. (Shown in 22K mode.)
2. SW202 (A-D); Input PHONO-2 capacitance selector switch. (Shown in 400PF mode.)
3. SW203 (A-H); Function selector switch. (Shown in PHONO-3 mode.)
4. SW301-A; Muting switch. (Shown in "off" position.)
5. SW301-B; Loudness switch. (Shown in "off" position.)
6. SW301-C; Tone control switch. (Shown in "off" position.)
7. SW301 (D-F); Tape monitor selector switch. (Shown in PHONO-3 MC mode.)
8. SW301 (G-I); Tape dubbing selector switch. (Shown in SOURCE mode.)
9. SW301-J; Mono switch. (Shown in "stereo" position.)
10. SW301 (K-N); Filter switch. (Shown in "off" position.)
11. SW901 (A-B); Power switch. (Shown in "off" position.)
12. SW902; Main voltage selector switch. (Shown in 220V mode.)
13. Capacitance values are in MFD, P=MMFD.
14. Resistor values are in ohm, K=1000.
15. Voltage readings are measures with VTVM under no signal input.


Q115 2SK127 Ⓟ
Q117, Q119 2SK127 Ⓢ
Q121, Q123 2SJ43 Ⓢ
Q101~Q106 2SK111 Ⓔ
Q107~Q110 2SJ43 Ⓟ
Q111~Q114 2SJ43 Ⓡ
Q116 2SK127 Ⓟ
Q118, Q120 2SK127 Ⓢ
Q122, Q124 2SJ43 Ⓢ
S0901-A L
S0901-B R
PHONO 3 MC
TM901
TM902
Q205, Q207 2SJ43 Ⓠ
Q209, Q211 2SJ43 Ⓟ
Q213, Q215 2SJ43 Ⓡ
Q219~Q224 2SK127 Ⓢ
Q225~Q230 2SJ43 Ⓢ
Q217, Q218 2SK127 Ⓟ
Q201, Q202 2SK111 Ⓓ
Q203, Q204 2SK109A Ⓓ
Q206, Q208 2SJ43 Ⓠ
Q210, Q212 2SJ43 Ⓟ
Q214, Q216 2SJ43 Ⓡ
SW201-C
SW202-C
PHONO 2
PHONO 1
SW201(A-C) INPUT IMPEDANCE SELECTOR
SW202(A-C) INPUT CAPACITANCE SELECTOR
TUNER
AUX
SW203(A-H) FUNCTION SELECTOR
PLAY
TAPE 1
REC
TAPE 2
OUTPUT
S0904 PB/REC
RLY302
RLY301
BALANCE CONTROL
VOLUME CONTROL
BASS CONTROL
TREBLE CONTROL
MUTING
LOUDNESS
TONE
TAPE MONITOR
SOURCE
TAPE DUBBING
MONO
FILTER
high
15 kHz
8 kHz
subsonic
30 Hz
15 Hz
SW301-A
SW301-B
SW301-C
SW301-D
SW301-E
SW301-F
SW301-G
SW301-H
SW301-I
SW301-J
SW301-K
SW301-L
SW301-M
SW301-N
D503~D514 GL-9NG12
Q401, Q402 2SC2320 Ⓖ
Q403 2SA999 Ⓕ
Q501 2SD794 Ⓠ
IMPEDANCE INDICATOR D515~D517 GL2PR1
CAPACITANCE INDICATOR D518~D520 GL2PR1
Q502~Q507 2SA999 Ⓕ
Q301, Q302 2SK109A Ⓓ
Q303~Q306 2SK34 Ⓔ
Q307~Q310 2SJ43 Ⓟ
Q311~Q314 2SJ43 Ⓡ
Q315, Q316 2SK127 Ⓟ
Q317~Q320 2SK127 Ⓢ
Q321~Q324 2SJ43 Ⓢ
Q325, Q326 2SK34 Ⓒ3
Q601, Q602 2SK34 Ⓒ3
Q603, Q605 2SC2320 Ⓖ
Q604, Q606 2SA999 Ⓕ
Q607 2SD794A Ⓠ
Q608 2SB744A Ⓠ
T250mA : 110V
T125 mA : 220/240V
FUSE
F901
power switch SW901
SW902 voltage selector
C901 0.047/250V
AC110/220/240V 50/60Hz
WHITE 240V
ORANGE 220V
RED 110V
T901
D601 DS18SD
NOTE
1. Ⓜ MICA CAPACITORS
2. Ⓢ POLYSTYRENE FILM CAPACITORS
3. Ⓕ FUSIBLE RESISTOR

SW NO.	POSITION				
SW 201	22 KΩ	47 KΩ	100 KΩ		
SW 202	400PF	300 PF	200PF		
SW 203	PHONO3 MC	PHONO2	PHONO1	TUNER	AUX

(Specifications or wiring diagrams of this model are subject to change for the improvement without prior notice.)

NOTES: Be sure to use regular parts for securing the safety and reliability of the set. Parts marked with "⚠" and parts crosshatched (in black) are especially important for maintaining the safety and protecting ability of the set. Be sure to replace them with parts of specified part number.

Figure 13 SCHEMATIC DIAGRAM

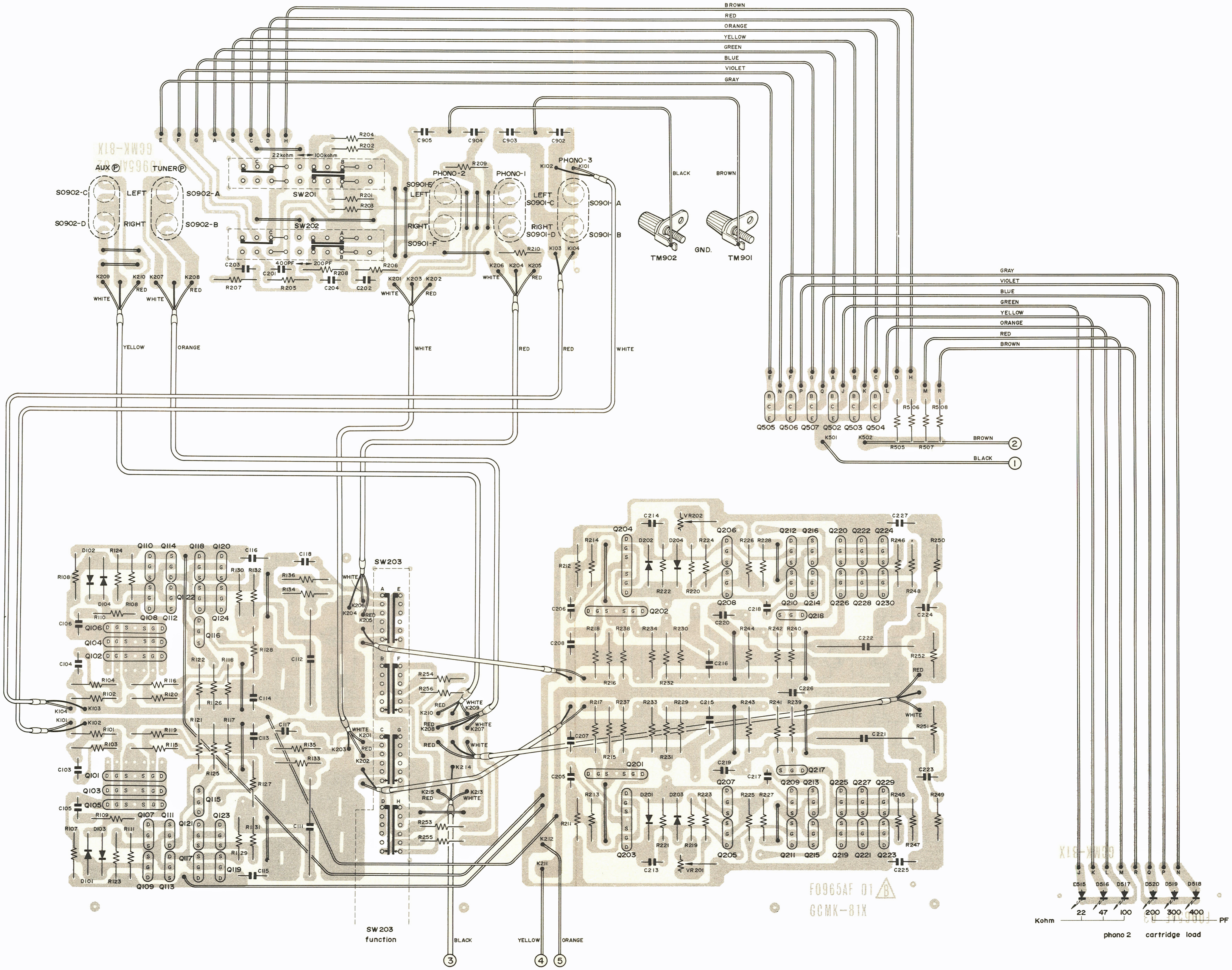

BROWN
RED
ORANGE
YELLOW
GREEN
BLUE
VIOLET
GRAY
AUX Ⓟ
TUNER Ⓟ
S0902-C
S0902-D
S0902-A
S0902-B
LEFT
RIGHT
SW201
SW202
22 kohm
100 kohm
400PF
200PF
PHONO-2
PHONO-1
PHONO-3
S0901-E
S0901-F
S0901-C
S0901-D
S0901-A
S0901-B
C905
C904
C903
C902
BLACK
TM902
GND.
TM901
WHITE
SW203
SW203
function
Q505 Q506 Q507 Q502 Q503 Q504
R506
R508
R505
R507
K501
K502
①
②
③
④
⑤
F0965AF 01
GCMK-81X
Kohm
22 47 100
200 300 400
PF
phono 2
cartridge load

Figure 15 WIRING SIDE OF P.W. BOARD

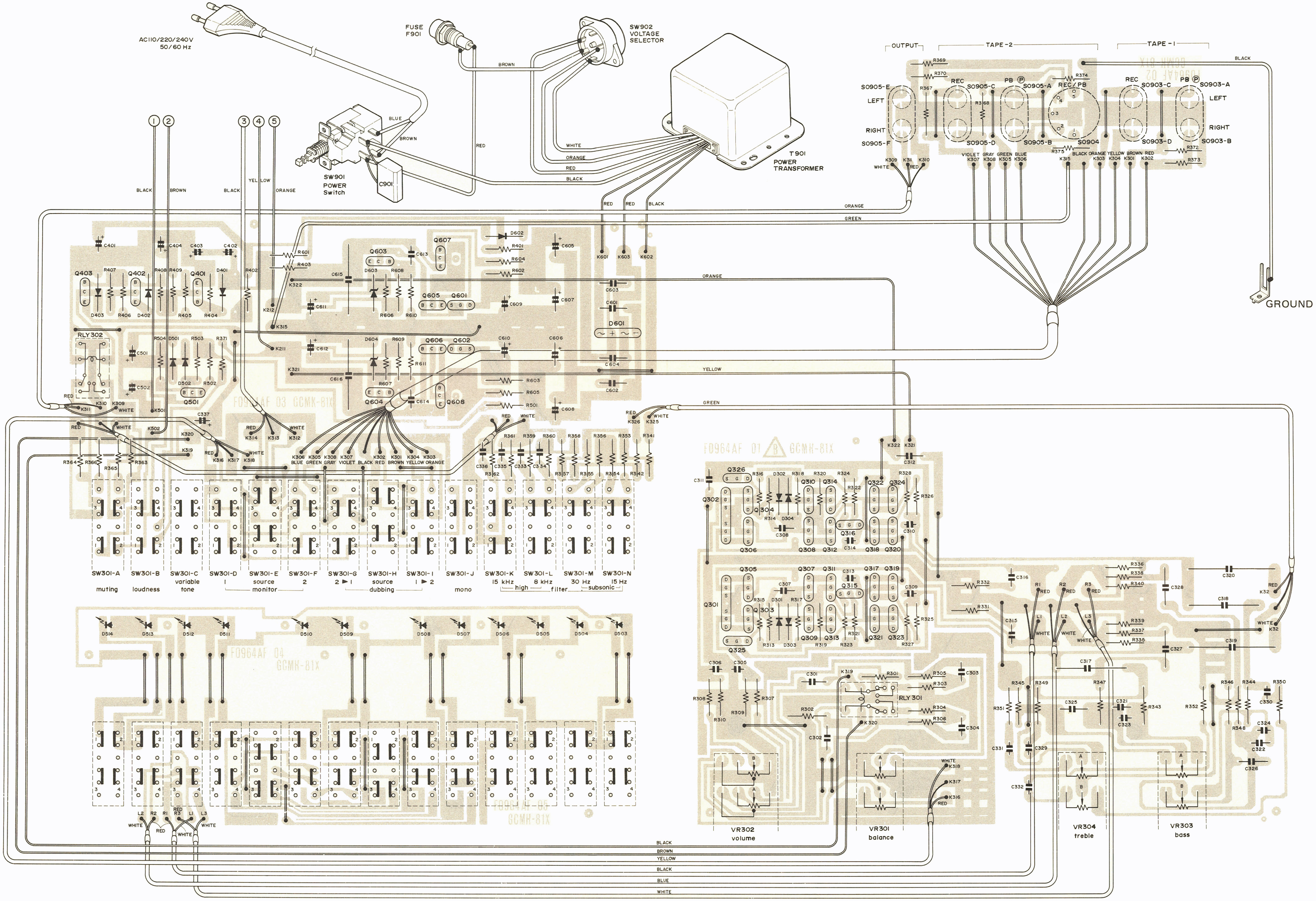

AC110/220/240V
50/60 Hz
FUSE
F901
SW902
VOLTAGE
SELECTOR
SW901
POWER
Switch
C901
T901
POWER
TRANSFORMER
BROWN
BLUE
RED
WHITE
ORANGE
BLACK
YELLOW
GREEN
OUTPUT
TAPE-2
TAPE-1
S0905-E
S0905-F
S0905-C
S0905-D
S0905-A
S0905-B
S0904
S0903-C
S0903-A
S0903-D
S0903-B
LEFT
RIGHT
REC
PB Ⓟ
REC/PB
VIOLET
GRAY
GREEN
BLUE
BROWN
GROUND
RLY302
RLY301
D601
SW301-A
muting
SW301-B
loudness
SW301-C
variable
tone
SW301-D
1
SW301-E
source
monitor
SW301-F
2
SW301-G
2 ▶ 1
SW301-H
source
dubbing
SW301-I
1 ▶ 2
SW301-J
mono
SW301-K
15 kHz
high
SW301-L
8 kHz
filter
SW301-M
30 Hz
SW301-N
15 Hz
subsonic
FD964AF 03 GCMK-81X
FD964AF 01 GCMK-81X
FD964AF 04 GCMK-81X
FD964AF-05 GCMK-81X
VR302
volume
VR301
balance
VR304
treble
VR303
bass
① ② ③ ④ ⑤

Figure 17 WIRING SIDE OF P.W. BOARD

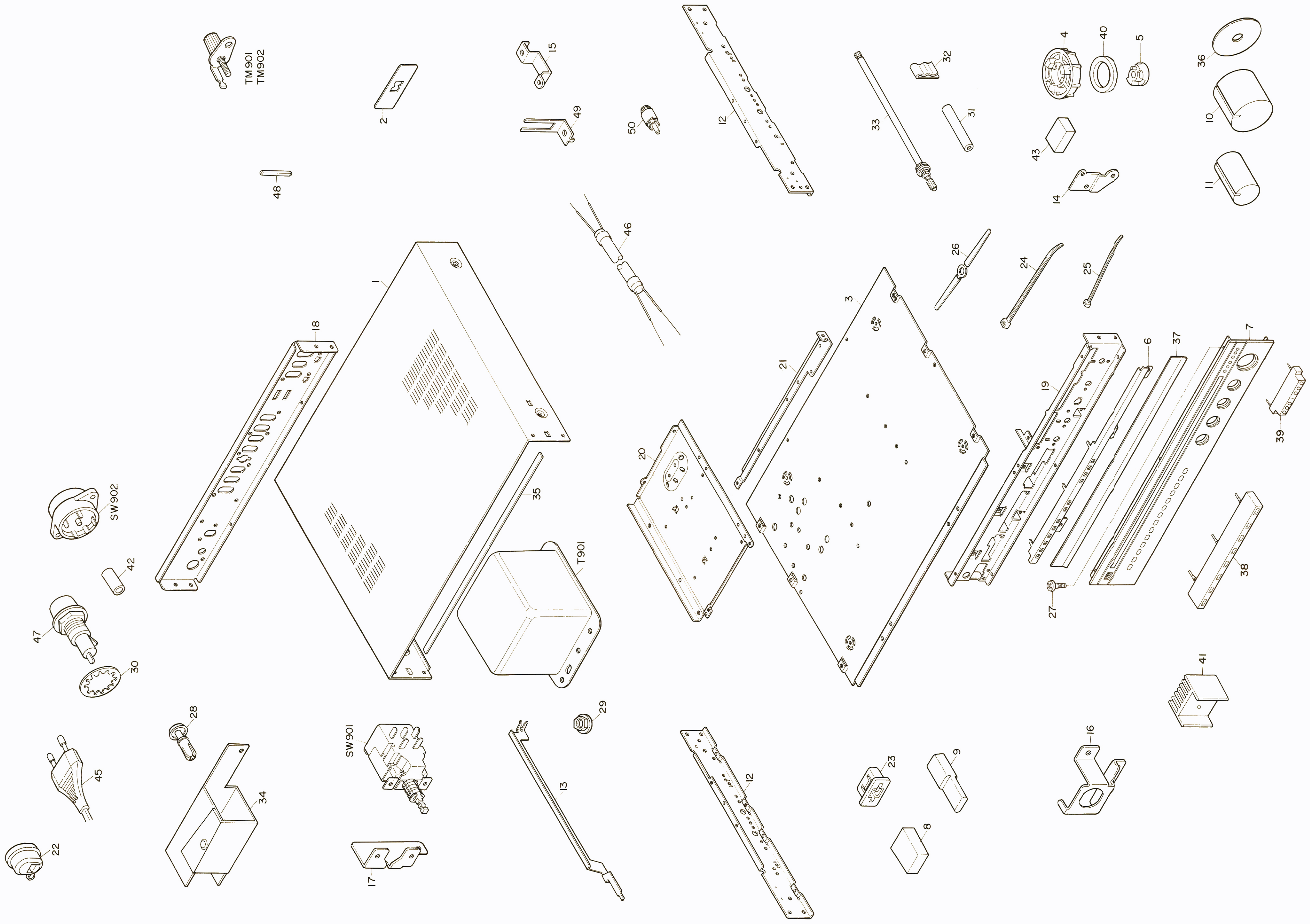

TM901
TM902
2
15
49
50
12
33
32
31
4
40
5
36
10
43
14
11
48
46
26
24
25
1
3
18
21
20
19
6
37
7
39
35
SW902
42
T901
38
27
47
30
41
28
29
SW901
45
34
13
12
23
9
16
22
8
17

Figure 20 MISCELLANEOUS PARTS GUIDE

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
C213, C214	VCQSMU1HS152J	1500PF, 50V, ±5%, Styrol	AB
C215, C216	VCQSMA1HL393G	.039MFD, 50V, ±2%, Styrol	AF
C217, C218	VCMZYU1HC330J	33PF, 50V, ±5%, Mica	
C219, C220	VCQSMA1HL113G	.011MFD, ±2%, Styrol	AD
C221, C222	VCFYSU2AB475K	4.7MFD, 100V, ±10%, Metalized Film	
C223, C224	VCQSMU1HS152J	1500PF, 50V, ±5%, Styrol	AB
C225, C226, C227	VCQYKU1HM473K	.047MFD, 50V, ±10%, Mylar	AB
C301, C302	VCQYKU1HM683J	.068MFD, 50V, ±5%, Mylar	AC
C303, C304	VCMZYU1HC271J	270PF, 50V, ±5%, Mica	
C305, C306	VCMZYU1HC560J	56PF, 50V, ±5%, Mica	
C307, C308	VCMZYU1HC391J	390PF, 50V, ±5%, Mica	
C309, C310	VCMZYU1HC100J	10PF, 50V, ±5%, Mica	
C311, C312	VCQYKU1HM473K	.047MFD, 50V, ±10%, Mylar	AB
C313, C314	VCMZYU1HC560J	56PF, 50V, ±5%, Mica	
C315, C316	VCMZYU1HC331J	330PF, 50V, ±5%, Mica	
C317, C318	VCFYSU2AB225K	2.2MFD, 100V, ±10%, Metalized Film	
C319, C320	VCFYSU2AB475K	4.7MFD, 100V, ±10%, Metalized Film	
C321, C322	VCQYKU1HM153J	.015MFD, 50V, ±5%, Mylar	AB
C323, C324	VCQYKU1HM222K	.0022MFD, 50V, ±10%, Mylar	AA
C325, C326	VCQYKU1HM104J	.1MFD, 50V, ±5%, Mylar	AC
C327, C328	VCQYKU1HM224K	.22MFD, 50V, ±10%, Mylar	AD
C329, C330	VCQYKU1HM102J	.001MFD, 50V, ±5%, Mylar	AB
C331, C332	VCQYKU1HM562J	.0056MFD, 50V, ±5%, Mylar	AB
C333, C334	VCQYKU1HM393J	.039MFD, 50V, ±5%, Mylar	AB
C335, C336	VCQYKU1HM183J	.018MFD, 50V, ±5%, Mylar	AB
⚠C601, ⚠C602, ⚠C603, ⚠C604	VCQYKU2AM104M	.1MFD, 100V, ±20%, Mylar	AC
C613, C614	VCMZYU1HC391J	390PF, 50V, ±5%, Mica	
C615, C616	VCFYSU2AB225K	2.2MFD, 100V, ±10%, Metalized Film	
⚠C901	RC-HZ064CAFZZ	.047MFD, 250V AC, ±20%, Metalized Film	AG
C902, C903, C904, C905	VCKZPU1HF223Z	.022MFD, 50V, +80 −20%, Ceramic	

RESISTORS

(Unless otherwise specified resistors are 1/4W, ±5%, Carbon Type.)

REF. NO.	PART NO.	DESCRIPTION	CODE
R101, R102	VRD-ST2HD1R0J	1 ohm, 1/2W, ±5%, Carbon	
R103, R104	VRD-ST2HD101J	100 ohm, 1/2W, ±5%, Carbon	
R107, R108	VRD-ST2HD332J	3.3K ohm, 1/2W, ±5%, Carbon	
R109, R110	VRD-ST2EE121J	120 ohm	
R111, R112	VRD-ST2HD332J	3.3K ohm, 1/2W, ±5%, Carbon	
R115, R116	VRD-ST2HD102J	1K ohm, 1/2W, ±5%, Carbon	
R117, R118	VRD-ST2HD122J	1.2K ohm, 1/2W, ±5%, Carbon	
R119, R120	VRD-ST2HD6R8J	6.8 ohm, 1/2W, ±5%, Carbon	
R121, R122	VRD-ST2EE103J	10K ohm	
R123, R124	VRD-ST2HD123J	12K ohm, 1/2W, ±5%, Carbon	
R125, R126	VRD-ST2EE103J	10K ohm	
R127, R128	VRD-ST2HD680J	68 ohm, 1/2W, ±5%, Carbon	
R129, R130	VRD-ST2EE820J	82 ohm	
R131, R132	VRD-ST2EE820J	82 ohm	
R133, R134	VRD-ST2EE393J	39K ohm	
R135, R136	VRD-ST2HD101J	100 ohm, 1/2W, ±5%, Carbon	
R201, R202	VRD-ST2EE104J	100K ohm	
R203, R204	VRD-ST2EE273J	27K ohm	
R205, R206, R207, R208	VRD-ST2EE105J	1 Meg ohm	
R209, R210	VRD-ST2HD104J	100K ohm, 1/2W, ±5%, Carbon	
R211, R212	VRD-ST2EE224J	220K ohm	
R213, R214	VRD-ST2EE473J	47K ohm	
R215, R216	VRD-ST2HD104J	100K ohm, 1/2W, ±5%, Carbon	
R217, R218	VRD-ST2HD101J	100 ohm, 1/2W, ±5%, Carbon	
R219, R220	VRD-ST2EE681J	680 ohm	
R221, R222	VRD-ST2EE470J	47 ohm	
R223, R224	VRD-ST2EE681J	680 ohm	
R225, R226	VRD-ST2EE821J	820 ohm	
R227, R228	VRD-ST2EE222J	2.2K ohm	

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
R229, R230	VRN-RT2EC104F	100K ohm, 1/4W, ±1%, Metal Film	
R231, R232	VRN-RT2EC474F	470K ohm, 1/4W, ±1%, Metal Film	
R233, R234	VRD-ST2HD181J	180 ohm, 1/2W, ±5%, Carbon	
R237, R238	VRD-ST2EE822J	8.2K ohm	
R239, R240	VRD-ST2EE332J	3.3K ohm	
R241, R242	VRD-ST2EE392J	3.9K ohm	
R243, R244	VRN-RT2EC682F	6.8K ohm, 1/4W, ±1%, Metal Film	
R245, R246, R247, R248	VRD-ST2EE560J	56 ohm	
R249, R250	VRD-ST2EE224J	220K ohm	
R251, R252	VRD-ST2HD681J	680 ohm, 1/2W, ±5%, Carbon	
R253, R254, R255, R256	VRD-ST2EE331J	330 ohm	
R301, R302	VRD-ST2EE822J	8.2K ohm	
R303, R304	VRD-ST2EE333J	33K ohm	
R305, R306	VRD-ST2EE105J	1 Meg ohm	
R307, R308	VRD-ST2EE681J	680 ohm	
R309, R310	VRD-ST2EE274J	270K ohm	
R313, R314	VRD-ST2EE391J	390 ohm	
R315, R316, R317, R318	VRD-ST2EE682J	6.8K ohm	
R319, R320	VRD-ST2EE822J	8.2K ohm	
R321, R322	VRD-ST2EE223J	22K ohm	
R323, R324	VRD-ST2EE223J	22K ohm	
R325, R326, R327, R328	VRD-ST2EE820J	82 ohm	
R331, R332	VRD-ST2EE821J	820 ohm	
R335, R336	VRD-ST2EE472J	4.7K ohm	
R337, R338	VRD-ST2EE224J	220K ohm	
R339, R340	VRD-ST2EE821J	820 ohm	
R341, R342	VRD-ST2EE470J	47 ohm	
R343, R344	VRD-ST2EE223J	22K ohm	
R345, R346	VRD-ST2EE392J	3.9K ohm	

REF. NO.	PART NO.	DESCRIPTION	CODE
R347, R348	VRD-ST2EE332J	3.3K ohm	
R349, R350	VRD-ST2EE472J	4.7K ohm	
R351, R352	VRD-ST2EE821J	820 ohm	
R353, R354	VRD-ST2EE222J	2.2K ohm	
R355, R356	VRD-ST2EE122J	1.2K ohm	
R357, R358	VRD-ST2EE471J	470 ohm	
R359, R360, R361, R362	VRD-ST2EE105J	1 Meg ohm	
R363, R364	VRD-ST2EE562J	5.6K ohm	
R365, R366	VRD-ST2EE681J	680 ohm	
R367, R368	VRD-ST2EE394J	390K ohm	
R369, R370	VRD-ST2EE104J	100K ohm	
⚠R371	VRG-ST2EA271J	270 ohm, 1/4W, ±5%, Fusible	AB
R372, R373, R374, R375	VRD-ST2EE105J	1 Meg ohm	
⚠R401	VRG-ST2EA471J	470 ohm, 1/4W, ±5%, Fusible	AB
⚠R402	VRG-ST2EA391J	390 ohm, 1/4W, ±5%, Fusible	AB
R403	VRD-ST2EE103J	10K ohm	
R404	VRD-ST2EE154J	150K ohm	
R405	VRD-ST2EE274J	270Kohm	
R406	VRD-ST2EE681J	680 ohm	
R407	VRD-ST2EE153J	15K ohm	
R408	VRD-ST2EE102J	1K ohm	
R409	VRD-ST2EE100J	10 ohm	
⚠R501	VRG-ST2EA271J	270 ohm, 1/4W, ±5%, Fusible	AB
R502	VRD-ST2EE390J	39 ohm	
R503	VRD-ST2EE122J	1.2K ohm	
R504	VRD-ST2EE153J	15K ohm	
R505, R506	VRD-ST2EE223J	22K ohm	
R507, R508	VRD-ST2EE101J	100 ohm	
R601	VRD-ST2EE332J	3.3K ohm	
⚠R602, ⚠R603	VRG-ST2EA471J	470 ohm, 1/4W, ±5%, Fusible	AB
⚠R604, ⚠R605	VRG-ST2EA150J	15 ohm, 1/4W, ±5%, Fusible	AB
R606, R607	VRD-ST2EE392J	3.9K ohm	
R608, R609	VRD-ST2EE123J	12K ohm	
R610, R611	VRD-ST2EE103J	10K ohm	

MISCELLANEOUS

REF. NO.	PART NO.	DESCRIPTION	CODE
1	GCAB-3067AFSA	Cabinet	AX
2	GCOVA1161AFZZ	Cover, Switch (SW201, SW202)	AB
3	GFTAU3086AFZZ	Bottom Plate	AQ
4	GLEGP0065AF00	Leg, Outer (Large)	AB
5	GLEGP0066AF00	Leg, Inner (Small)	AA

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
6	HDECA0341AFSA	Decoration Metal, LED Indicator	AH
7	HPNLC3393AFSA	Front Panel (SO-9100H)	BA
7-A	GMADZ0051AFZZ	Window	AP
7-B	PSPAG0066AF00	Cushion, 3mm x 5mm x 1.5mm	AA
7-C	PSPAS0080AFSA	Spacer, Power Switch Knob	AB
7-D	PSPAS0084AFSA	Spacer, Push Switch Knobs (SO-9100H)	AA
8	JKNBM0297AFSA	Knob, Power Switch (SO-9100H)	AD
9	JKNBM0298AFSA	Knob, Subsonic Filter/High Filter/Mono Switch/Tape Dubbing Selector/Tape Monitor Selector/Tone Control Circuit On/Off/Loudness Contour/Audio Muting (SO-9100H)	AD
10	JKNBN0403AFSA	Knob, Volume Control (SO-9100H)	AL
11	JKNBN0404AFSA	Knob, Bass Control/Treble Control/Function Selector/Balance Control (SO-9100H)	AH
12	LANGF0481AFZZ	Bracket, Left and Right Hand Side, Chassis	AE
13	LANGG0066AFZZ	Lever, Power Switch	AD
14	LANGK0232AFZZ	Bracket, Decoration Metal Retaining	AC
15	LANGK0233AFZZ	Bracket, Printed Wiring Board Retaining	AB
16	LANGQ0650AFZZ	Bracket, Strengthen	AB
17	LANGQ0652AFZZ	Bracket, Power Switch	AB
18	LANGQ0692AFSA	Bracket, Sockets (SO-9100H)	AQ
19	LANGR0481AFZZ	Bracket, Front Chassis	AH
20	LANGR0482AFZZ	Bracket, Power Transformer	AE
21	LANGT0857AFZZ	Bracket, Printed Wiring Board Retaining	AD
22	LBSHC0004AGZZ	Bushing, Main Supply Cord Refer to TABLE 1	AB
	LBSHC0007AFZZ	Bushing, Main Supply Cord	AB
23	LHLDS1052AF00	Guide, Power Switch Lever	AB
24	LHLDW1068AFZZ	Nylon Band, 100mm	AA
25	LHLDW1075AFZZ	Nylon Band, 60mm	AA
26	LHLDW9002CEZZ	Wire Holder	AA
27	LX-BZ0261AFFD	Screw	AA
28	LX-LZ0051AF00	Push Rivet, Power Switch Cover Retaining	
29	LX-NZ0122AFFD	Nut, Power Transformer Retaining	AA
30	LX-WZ5065AGFE	Shakeproof Lock Washer Internal Type, Fuse Holder	AA
31	MJNT-1001AFZZ	Coupling, Function Selector Shaft	AC
32	MSPRK0054AFFJ	Plate Spring, Function Selector Shaft	AB
33	NSFTS0058AFZZ	Shaft, Function Selector	AG
34	PCOVW1105AFZZ	Cover, Power Switch	AE
35	PFLT-0330AF00	Felt, Cabinet	AA
36	PFLT-0367AFZZ	Felt, 32mm Dia. x 4.8mm Dia. x 0.9mm	AA
37	PFLT-0372AF00	Felt, 370mm x 24mm	AB
38	PGUMM0132AFZZ	Holder, LED Rubber	AE
39	PGUMM0136AFZZ	LED, Holder	AF
40	PGUMM0139AF00	Cushion, 22mm Dia. x 15.5mm Dia. x 2.2mm, Outer Lug	AA
41	PRDAR0184AFZZ	Heat Sink	AE

REF. NO.	PART NO.	DESCRIPTION	CODE
42	PSPAB0103AFFW	Spacer, Voltage Selector Switch	AA
43	PSPAG0075AFZZ	Cushion, 10mm x 6mm x 6mm	AA
⚠45	QACCL0001AFZZ	Mains Supply Cord Refer to TABLE 1	AL
	QACCV0001AGZZ	Mains Supply Cord	AL
	QACCZ0002TA0F	Mains Supply Cord	AG
	QACCZ0053AF00	Mains Supply Cord	AK
46	QCNW-0554AFZZ	Cable, 8-Lead (410mm)	AN
⚠F901	QFS-C121CAGNI	Fuse, T124mA (220V/240V)	AE
	QFS-C251CAGNI	Fuse, T250mA (110V)	AE
47	QFSHP1001AGZZ	Fuse Holder	AG
48	QLUGP0111CEFW	Lug Terminal, Printed Wiring Board	AA
49	QLUGZ015AAFZZ	Lug, Earth Terminal	AA
50	QPLGS0253AFZZ	Short Plug (Gold Plating)	AB
SO904	QSOCD2553AFZZ	Socket, TAPE-2 Record/Playback	AD
⚠SW902	QSOCE0558AFZZ	Voltage Selector	AG
SO902-(A ~ D)	QSOCJ0472AFZZ	Socket Assembly SO902-A.B; Tuner Input SO902-C.D; AUX Input	AE
SO903-(A ~ D)	QSOCJ0472AFZZ	Socket Assembly, TAPE-1 SO903-A.B; Input SO903-C.D; Output	AE
SO905-(A ~ F)	QSOCJ0673AFZZ	Socket Assembly, TAPE-2 SO905-A.B; Input SO905-C.D; Output SO905-E.F; Pre-amplifier Output	AG
SO901-(A ~ F)	QSOCJ0674AFZZ	Socket Assembly (Gold Plating), SO901-A.B; PHONO-3 Input SO901-C.D; PHONO-1 Input SO902-E.F; PHONO-2 Input	AL
⚠SW901-(A ~ B)	QSW-P0158AFZZ	Switch, Power On/Off	AL
SW301-(A ~ N)	QSW-P0232AFZZ	Switch Assembly, SW301-A (1 ~ 4); Muting SW301-B (1 ~ 2); Loudness Contour SW301-C (1 ~ 2); Tone Control Circuit On/Off SW301-D (1 ~ 4); Tape Monitor 1 SW301-E (1 ~ 4); Tape Monitor SOURCE SW301-F (1 ~ 4); Tape Monitor 2 SW301-G (1 ~ 4); Tape Dubbing 2▶1 SW301-H (1 ~ 4); Tape Dubbing SOURCE SW301-I (1 ~ 4); Tape Dubbing 1▶2 SW301-J (1 ~ 4); Mono SW301-K (1 ~ 4); High Filter 15kHz SW301-L (1 ~ 4); High Filter 8kHz SW301-M (1 ~ 4); Subsonic Filter 30Hz SW301-N (1 ~ 4); Subsonic Filter 15Hz	AZ
SW203-(A ~ H)	QSW-R0169AFZZ	Switch, Function Selector	AP

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
SW201-(A ~ D)	QSW-S0261AFZZ	Switch, Impedance Selector for PHONO-2 Input	AF
SW202-(A ~ D)	QSW-S0261AFZZ	Switch, Capacitance Selector for PHONO-2 Input	AF
RLY301	RRLYZ0070AFZZ	Relay, Loudness	AQ
RLY302	RRLYZ0070AFZZ	Relay, Muting	AQ
	SPAKA0575AFZZ	Cushion, Packing, Left Hand Side	AF
	SPAKA0568AFZZ	Cushion, Packing, Right Hand Side	AF
	SPAKC1337AFZZ	Packing (SO-9100H)	AM
	SPAKF0002AGZZ	Packing Material, Main Supply Cord	AB
	SPAKX0228AFZZ	Packing Add, Upper Side	AE
	SSAKH0007SEZZ	Polyethylene Bag, Operation Manual	AA

REF. NO.	PART NO.	DESCRIPTION	CODE
	SSAKH0156AFZZ	Polyethylene Bag, Unit	AC
	TINSZ0172AFZZ	Operation Manual	AQ
	TTAGH0097AFZZ	Tag, English/German/French/ Spanish/Swedish	AD
TM901, TM902	QTANN0153AFZZ	Ground Terminal	AC

P.W.B. ASSEMBLY (Not Replacement Item)

REF. NO.	PART NO.	DESCRIPTION	CODE
PWB-A	DUNTM0062AF02 (Combined Assembly)	Power Supply, Tone Amplifier, Relay Control	BY
PWB-B	DUNTP0046AF02 (Combined Assembly)	MC Head Amplifier, Equalizer Amplifier	BX

DIFFERENCE BETWEEN SO-9100H AND SO-9100HB

REF. NO.	SO-9100H (Front Panel: Silver)		SO-9100HB (Front Panel: Brown)		DESCRIPTION
	PARTS NO.	CODE	PARTS NO.	CODE	
7	HPNLC0093AFSA	BA	HPNLC3393AFSB	BA	Front Panel
7-A	GMADZ0051AFZZ	AP	GMADZ0051AFZZ	AP	Window
7-B	PSPAG0066AF00	AA	PSPAG0066AF00	AA	Cushion, 30mm x 5mm x 1.5mm
7-C	PSPAS0080AFSA	AB	PSPAS0080AFSB	AB	Spacer, Power Switch Knob
7-D	PSPAS0084AFSA	AA	PSPAS0084AFSB	AA	Spacer, Push Switch Knobs
8	JKNBM0297AFSA	AD	JKNBM0297AFSB	AD	Knob, Power Switch
9	JKNBM0298AFSA	AD	JKNBN0298AFSB	AD	Knob, Subsonic Filter/High Filter/ Mono Switch/Tape Dubbing Selector/Tone Control Circuit On/ Off/Loudness Contour/Audio Muting
10	JKNBN0403AFSA	AL	JKNBN0403AFSB	AM	Knob, Volume Control
11	JKNBN0404AFSA	AH	JKNBN0404AFSB	AK	Knob, Bass Control/Treble Control/ Function Selector/Balance Control
18	LANGQ0692AFSA	AQ	LANGQ715AFSA	AQ	Bracket, Sockets
	SPAKC1337AFZZ	AM	SPAKC1361AFZZ	AN	Packing

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REPLACEMENT PARTS LIST

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

NOTES: Be sure to use regular parts for securing the safety and reliability of the set. Parts marked with " ⚠ " and parts cross-hatched (in black) are especially important for maintaining the safety and protecting ability of the set.
Be sure to replace them with parts of specified part number.

TRANSISTORS

REF. NO.	PART NO.	DESCRIPTION	CODE
Q101, Q102, Q103, Q104, Q105, Q106	VS2SK111-E/-1	Dual FET, Moving Coil Head Amplifier Circuit, First Differential Amplifier (2SK111E)	AM
Q107, Q108, Q109, Q110	VS2SJ43-P//1F	FET, Moving Coil Head Amplifier Circuit, Second Differential Amplifier (2SJ43P)	AE
Q111, Q112, Q113, Q114	VS2SJ43-R//1F	FET, Moving Coil Head Amplifier Circuit, Cascode Amplifier (2SJ43R)	AE
Q115, Q116	VS2SK127-P/1F	FET, Moving Coil Head Amplifier Circuit, Phase Inverter (2SK127P)	AE
Q117, Q118, Q119, Q120	VS2SK127-S/1F	FET, Moving Coil Head Amplifier Circuit, Output Amplifier (2SK127S)	AE
Q121, Q122, Q123, Q124	VS2SJ43-S//1F	FET, Moving Coil Head Amplifier Circuit, Output Amplifier (2SJ43S)	AE
Q201, Q202	VS2SK111-D/-1	Dual FET, Equalizer Amplifier Circuit, First Differential Amplifier (2SK111D)	AP
Q203, Q204	VS2SK109A-D-1	Dual FET, Equalizer Amplifier Circuit, Cascode Amplifier (2SK109AD)	AH
Q205, Q206, Q207, Q208	VS2SJ43-Q//1F	FET, Equalizer Amplifier Circuit (2SJ43Q)	AE
Q209, Q210, Q211, Q212	VS2SJ43-P//1F	FET, Equalizer Amplifier Circuit, Second Differential Amplifier (2SJ43P)	AE
Q213, Q214, Q215, Q216	VS2SJ43-R//1F	FET, Equalizer Amplifier Circuit, Cascode Amplifier (2SJ43R)	AE
Q217, Q218	VS2SK127-P/1F	FET, Equalizer Amplifier Circuit, Phase Inverter (2SK127P)	AE
Q219, Q220, Q221, Q222, Q223, Q224	VS2SK127-S/1F	FET, Equalizer Amplifier Circuit, Output Amplifier (2SK127S)	AE
Q225, Q226, Q227, Q228, Q229, Q230	VS2SJ43-S//1F	FET, Equalizer Amplifier Circuit, Output Amplifier (2SJ43S)	AE
Q301, Q302	VS2SK109A-D-1	Dual FET, Tone Amplifier Circuit, First Differential Amplifier (2SK109AD)	AH
Q303, Q304, Q305, Q306	VS2SK34-E//-1	FET, Tone Amplifier Circuit, Cascode Amplifier (2SK34E)	AE
Q307, Q308, Q309, Q310	VS2SJ43-P//1F	FET, Tone Amplifier Circuit, Second Differential Amplifier (2SJ43P)	AE
Q311, Q312, Q313, Q314	VS2SJ43-R//1F	FET, Tone Amplifier Circuit, Cascode Amplifier (2SJ43R)	AE
Q315, Q316	VS2SK127-P/1F	FET, Tone Amplifier Circuit, Phase Inverter (2SK127P)	AE
Q317, Q318, Q319, Q320	VS2SK127-S/1F	FET, Tone Amplifier Circuit, Output Amplifier (2SK127S)	AE
Q321, Q322, Q323, Q324	VS2SJ43-S//1F	FET, Tone Amplifier Circuit, Output Amplifier (2SJ43S)	AE
Q325, Q326	VS2SK34-C3/1F	FET, Tone Amplifier Circuit, Constant Current for First Differential Amplifier (2SK34C3)	AE
Q401, Q402	VS2SC2320-G-1	Relay Control Circuit (2SC2320G)	AB
Q403	VS2SA999-F/-1	Relay Control Circuit, Switching (2SA999F)	AC
Q501	VS2SD794A-Q-1	Constant Current for L.E.D. (2SD794AQ)	AE
Q502, Q503, Q504, Q505, Q506, Q507	VS2SA999-F/-1	L.E.D. Driver (2SA999F)	AC
Q601, Q602	VS2SK34-C3/1F	FET, Constant Voltage Circuit, Constant Current Load (2SK34C3)	AE
Q603	VS2SC2320-G-1	Constant Voltage Circuit, Voltage Comparison (2SC2320G)	AB
Q604	VS2SA999-F/-1	Constant Voltage Circuit, Voltage Regulator (2SA999F)	AC

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
Q605	VS2SC2320-G-1	Constant Voltage Circuit, Voltage Regulator (2SC2320G)	AB
Q606	VS2SA999-F/-1	Constant Voltage Circuit, Voltage Regulator (2SA999F)	AC
Q607	VS2SD794A-Q-1	Constant Voltage Circuit, Voltage Regulator (2SD794AQ)	AE
Q608	VS2SB744A-Q-1	Constant Voltage Circuit, Voltage Regulator (2SB744AQ)	AE

DIODES

REF. NO.	PART NO.	DESCRIPTION	CODE
D101, D102, D103, D104	VHD1S2473//-1	Moving Coil Head Amplifier Circuit, Second Differential Amplifier (1S2473)	AB
D201, D202, D203, D204	VHD1S2473//-1	Equalizer Amplifier Circuit, Second Differential Amplifier (1S2473)	AB
D301, D302, D303, D304	VHD1S2473//-1	Tone Amplifier Circuit, Second Differential Amplifier (1S2473)	AB
D401	VHD1S2473//-1	Relay Control Circuit, Back-Current Prevention (1S2473)	AB
D402	VHD1S2473//-1	Relay Control Circuit, Bias (1S2473)	AB
D403	VHD1S2473//-1	Relay Control Circuit, Surge Current Prevention (1S2473)	AB
D501, D502	VHD1S2473//-1	Constant Current Circuit, Stabilizer (1S2473)	AB
D503	VHPGL-9NG12-1	L.E.D. Subsonic Filter 15Hz Indicator (GL9NG12)	AD
D504	VHPGL-9NG12-1	L.E.D. Subsonic Filter 30Hz Indicator (GL9NG12)	AD
D505	VHPGL-9NG12-1	L.E.D. High Filter 8kHz Indicator (GL9NG12)	AD
D506	VHPGL-9NG12-1	L.E.D. High Filter 15kHz Indicator (GL9NG12)	AD
D507	VHPGL-9NG12-1	L.E.D. Mono Indicator (GL9NG12)	AD
D508	VHPGL-9NG12-1	L.E.D. Tape Dubbing 1▶2 Indicator (GL9NG12)	AD
D509	VHPGL-9NG12-1	L.E.D. Tape Dubbing 2▶1 Indicator (GL9NG12)	AD
D510	VHPGL-9NG12-1	L.E.D. Tape Monitor 2 Indicator (GL9NG12)	AD
D511	VHPGL-9NG12-1	L.E.D. Tape Monitor 1 Indicator (GL9NG12)	AD
D512	VHPGL-9NG12-1	L.E.D. Tone Indicator (GL9NG12)	AD
D513	VHPGL-9NG12-1	L.E.D. Loudness Indicator (GL9NG12)	AD
D514	VHPGL-9NG12-1	L.E.D. Muting Indicator (GL9NG12)	AD
⚠D601	VHDDS185-D/-1	Power Rectifier (DS185D)	AE
⚠D602	VHD10E1////-1	Half-wave Rectifier (10E1)	AC
D603, D604	VHEHZ12A2L/-1	Zener, 12V/0.4W (HZ12L)	AC
D515, D516, D517	VHPGL2PR1//-1	L.E.D. PHONO-2 Inputs Impedance Indicator (GL2PR1)	AC

REF. NO.	PART NO.	DESCRIPTION	CODE
D518, D519, D520	VHPGL2PR1//-1	L.E.D. PHONO-2 Input Capacitance Indicator (GL2PR1)	AC

TRANSFORMERS

REF. NO.	PART NO.	DESCRIPTION	CODE
⚠T901	RTRNP0631AFZZ	Power	BC

CONTROLS

REF. NO.	PART NO.	DESCRIPTION	CODE
VR201, VR202	RVR-M0195AFZZ	Equalizer Amplifier Circuit, Output DC Voltage Adjust	AC
VR301-(A ~ B)	RVR-G0057AFZZ	Balance Control	AQ
VR302-(A ~ B)	RVR-Z0070AFZZ	Volume Control	AS
VR303-(A ~ B)	RVR-Z0071AFZZ	Bass Control	AQ
VR304-(A ~ B)	RVR-Z0071AFZZ	Treble Control	AQ

ELECTROLYTIC CAPACITORS

REF. NO.	PART NO.	DESCRIPTION	CODE
⚠C337	RC-EZ1012AFZZ	47MFD, 50V, +50 –10%	AC
⚠C401	RC-EZ1072AFZZ	100MFD, 50V, ±20%	AC
⚠C402, ⚠C403	RC-EZ1013AFZZ	10MFD, 50V, +50 –10%	AB
C404	RC-EZ1011AFZZ	330MFD, 6.3V, +50 –10%	AB
⚠C501	RC-EZ1072AFZZ	100MFD, 50V, ±20%	AC
C502	VCEAAU1HW335Y	3.3MFD, 50V, +50 –10%	AB
⚠C605, ⚠C606, ⚠C607, ⚠C608	RC-EZ1073AFZZ	220MFD, 50V, ±20%	AD
⚠C609, ⚠C610	RC-EZ1072AFZZ	100MFD, 50V, ±20%	AC
⚠C611, ⚠C612	RC-EZ1012AFZZ	47MFD, 50V, +50 –20%	AC

CAPACITORS

REF. NO.	PART NO.	DESCRIPTION	CODE
C103, C104	VCMZYU1HC331J	330PF, 50V, ±5%, Mica	
C105, C106	VCQSMU1HS472J	4700PF, 50V, ±5%, Styrol	AB
C111, C112	VCFYSU2AB475K	4.7MFD, 100V, ±10%, Metalized Film	
C113, C114, C115, C116	VCQYKU1HM473K	.047MFD, 50V, ±10%, Mylar	AB
C117, C118	VCMZYU1HC331J	330PF, 50V, ±5%, Mica	
C201, C202	VCMZYU1HC101J	100PF, 50V, ±5%, Mica	
C203, C204	VCMZYU1HC181J	180PF, 50V, ±5%, Mica	
C205, C206	VCQYKU1HM103K	01MFD, 50V, ±10%, Mylar	AA
C207, C208	VCMZYU1HC181J	180PF, 50V, ±5%, Mica	